

## **NOKIA**

VCR 3746 NE

VCR 3746 CE

VCR 3746 I

VCR 3746 EP

VR 374 D

## **SALORA**

VCR 836 NE

## **LUXOR**

VCR 4746 NE

## **FINLUX**

VCR 7456 NE

**Circuit diagrams, P.C.B., spare parts list, electrical alignment, mechanical adjustments.**



### **Safety Component!**

This symbol identifies in the circuit diagrams all safety critical parts. Replace only with specified part numbers.

**Service and repair work to be performed only in accordance with existing safety regulations!**

## PRECAUTIONS IN PART REPLACEMENT

*When servicing the unit with power on, be careful to the section marked white all over.*

*This is the primary power circuit which is live.*

When checking the soldering side in the tape travel mode, make sure first that the tape has been loaded and then turn over the PWB with due care to the primary power circuit.

Make readjustment, if needed after replacement of part, with the mechanism and its PWB in position in the main frame.

### **(1) Start and end sensors: Q851 and Q852**

Insert the sensor's projection deep into the upper hole of the holder. Referring to the PWB, fix the sensors tight enough.

### **(2) Photocoupler: IC901**

Refer to the symbol on the PWB and the anode marking of the part.

### **(3) Cam switches A and B: D852 and D853**

Adjust the notch of the part to the white marker of the symbol on the PWB. Do not allow any looseness.

### **(4) Take-up and supply sensors: D855 and D854**

Be careful not to confuse the setting direction of the parts in reference to the symbols on the PWB. Do not allow any looseness.

### **(5) Diode bridge: D901**

Adjust the + marking of the part to the symbol's cathode marking on the PWB.

# 1. SPECIFICATIONS

Format:	VHS PAL standard
Video recording system:	Two rotary heads, helical scan system
Video signal:	PAL/SECAM colour and B/G signals, 625 lines
Recording/playing time:	240 min max. with E-240 tape (SP) 480 min max. with E-240 tape (LP)
Tape width:	12.7mm
Tape speed:	23.39 mm/s (SP) 11.70 mm/s (LP)
Antenna:	75 ohm unbalanced
Receiving channel:	VHF Channel S1-S41, E2-E12 UHF Channel E21-E69
RF converter output signal:	UHF Channel E30-E39 (preset to CH E36)
Power requirement:	AC230V, 50Hz
Power consumption:	Approx. 16 W
Operating temperature:	5°C to 40°C
Storage temperature:	-20°C to 60°C
Weight:	Approx. 3.6 kg
Dimensions:	380 mm (W) x 290.3 mm (D) x 91.8 mm (H)
VIDEO	
Input:	1.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
S/N ratio:	45 dB
Horizontal resolution:	250 lines
AUDIO	0 dBs = 0.775 Vrms
Input:	Line: -3.8 dB, 47k ohm
Output:	Line: -3.8 dB, 1k ohm
S/N ratio:	42 dB
Frequency response:	80 Hz ~ 10 kHz
Accessories included:	75 ohm coaxial cable Operation manual Infrared remote control Battery (2pcs.)

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.
--

Note: The antenna must correspond to the new standard DIN 45325 (IEC 169 - 2) for combined UHF/VHF antenna with 75 ohm connector.

## PRECAUTIONS IN SERVICING

### 1. Mounting the PWBs

#### (1) Hand-inserted parts

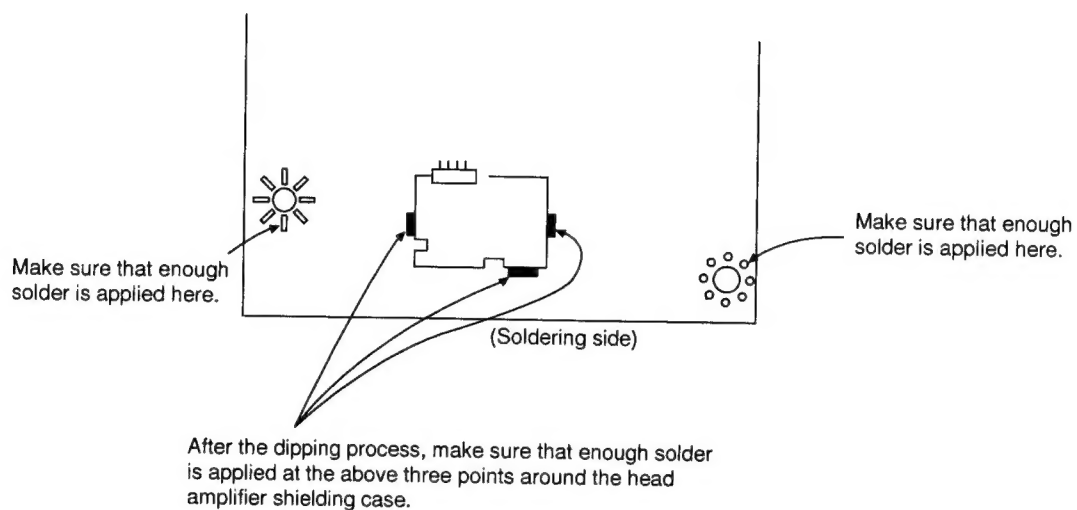
Make sure that the tuner, RCA jack, 21-pin socket, plug socket, remote control receiver, shielding case, switches, mechanism sensors and other hand-inserted parts are tight in position.

- ① The general safety instructions are issued by Safety Group. Follow the "Safety Precautions". Be also sure that the primary-power capacitors C905, C906 and C915 (parts depending on models) are tight enough in place.
- ② Handle the sensors and switches (start sensor, end sensor, cam switch, reel sensor, and record tip sensor) with care.

\*The preparatory step for the start and end sensors is the same as for the MS1 models.

#### (2) Soldered parts

- ① The board-to-board connector "AO", RCA jack and some other parts are soldered in position.



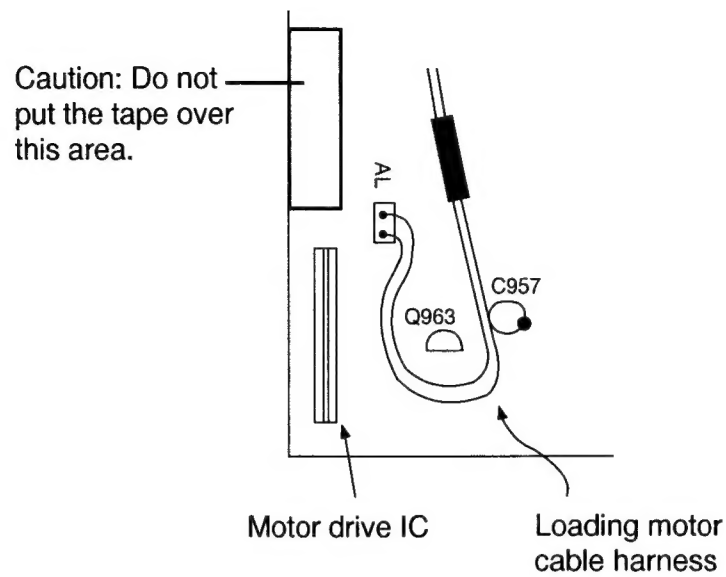
#### (3) Coaxial cables

- ① Connect the cable's straight end to the tuner and the L-shaped end to the converter.
- ② Connect the cable's L-shaped end to the tuner and the straight end to the converter.

## 2. Assembling the chassis

#### (1) Dressing the cables

- ① Be careful not to connect the flexible flat cables upside down. Their sockets are in special shape.
- ② Install the harnesses with care not to get caught by the frame and the mechanism (cassette controller).
- ③ Make sure that all the harnesses are tight in position.
- ④ Shape the loading motor cable harness as shown below.



## (2) Mounting the mechanism

\*Set up the mechanism with care to the sensors and the record tip switch. Keep the sensors free of dust, grease, etc.

\*Install the capstan motor with correct connections between the circuit boards.

## (3) Tightening the screws

Follow the instructions from Mechanism Group.

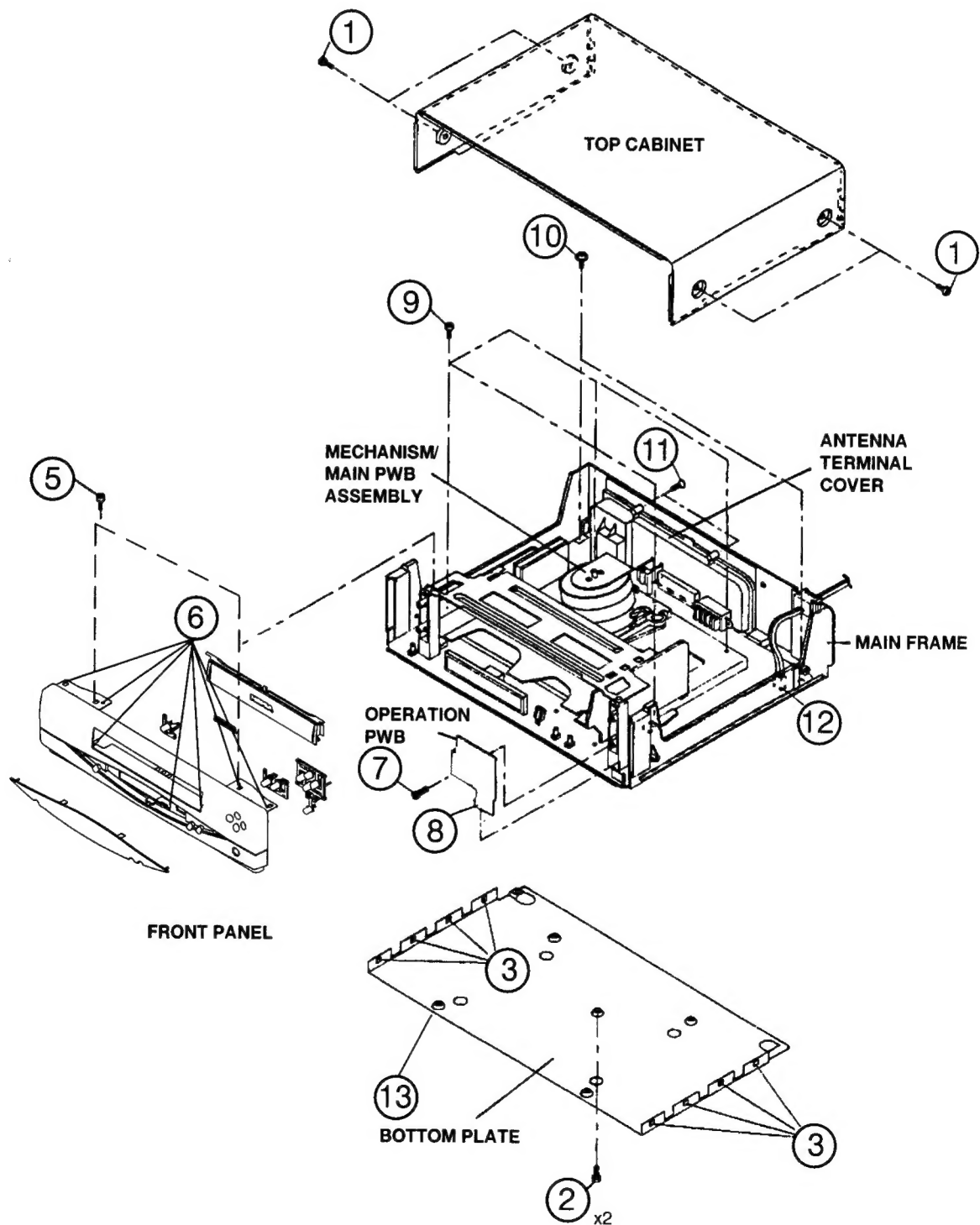
## 2. DISASSEMBLY AND REASSEMBLY

### 2-1 DISASSEMBLY OF MAJOR BLOCKS

**TOP CABINET** : Remove 4 screws ①.  
**BOTTOM PLATE** : Remove 1 screw ② and 8 hooks ③.  
**FRONT PANEL** : Remove 2 screws ⑤ and 7 clips ⑥.  
**OPERATION** : Remove 1 screw ⑦. Take it out of connector ⑧.

#### MECHANISM/ MAIN PWB ASSEMBLY

: Remove 4 screws ⑨, 2 screws ⑩ and 1 underneath ⑬, 2 screws ⑪ and 1 connector ⑫. Lift the antenna terminal cover and take the assembly out of the main frame.



## 2-2 DISASSEMBLING THE MECHANISM/MAIN PWB ASSEMBLY

**SHIELD CASE** : Remove 1 screw ⑬ and 1 screw ⑭.

**ANTENNA TERMINAL COVER** : Remove 2 screws ⑮ and 1 screw ⑯.

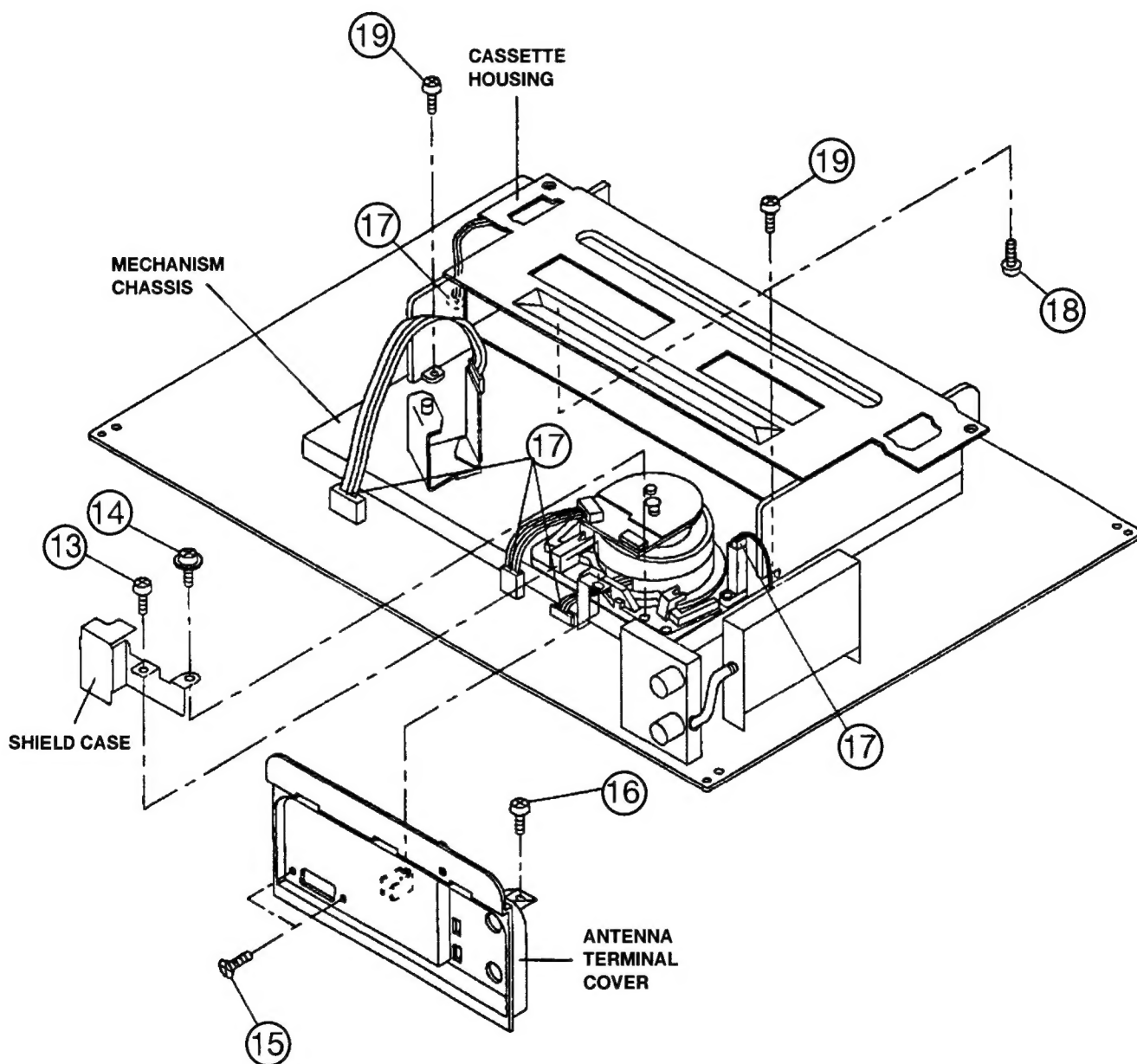
**MECHANISM CHASSIS/CASSETTE HOUSING ASSEMBLY** : Remove 3 FFCs and 2 harnesses ⑰.  
Be careful not to confuse the top and bottom of the FFC.

**CASSETTE HOUSING**

Remove 1 screw ⑱ from behind the main PWB.

Lift the mechanism chassis/cassette housing assembly vertically to take it out of the main PWB.

: Remove 2 screws ⑲.



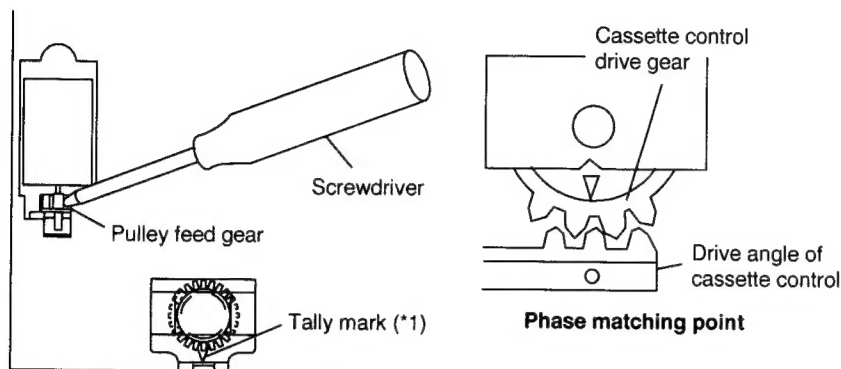
## 2-3 PRECAUTIONS IN REASSEMBLING

### MOUNTING THE CASSETTE CONTROLLER

Initial setting is indispensable before placing the cassette controller in the mechanism. The initial setting is made in two ways; electrical and mechanical.

#### Electrical setting:

Make a connection between TP5001 and TP5002, both located at the center on your side on main PWB, with a 22 ohm resistor and be sure that the mechanism is back to its initial setting position (\*1). Now place the cassette controller in position. (This method is used when the mechanism has been already set on its PWB.)



#### Mechanical setting:

Turn the loading motor's pulley feed gear using a screwdriver and be sure that the mechanism is back to its initial setting position (\*1). Now place the cassette controller in position. (This method is applicable for the mechanism alone.)

### COUPLING THE MECHANISM TO THE PWB

Match the mechanism's projections with the two symbols (round reference and oval sub-reference) on the main PWB. Place the mechanism straight down in position with due care so that the mechanism chassis's outer edges should not damage any parts nearby.

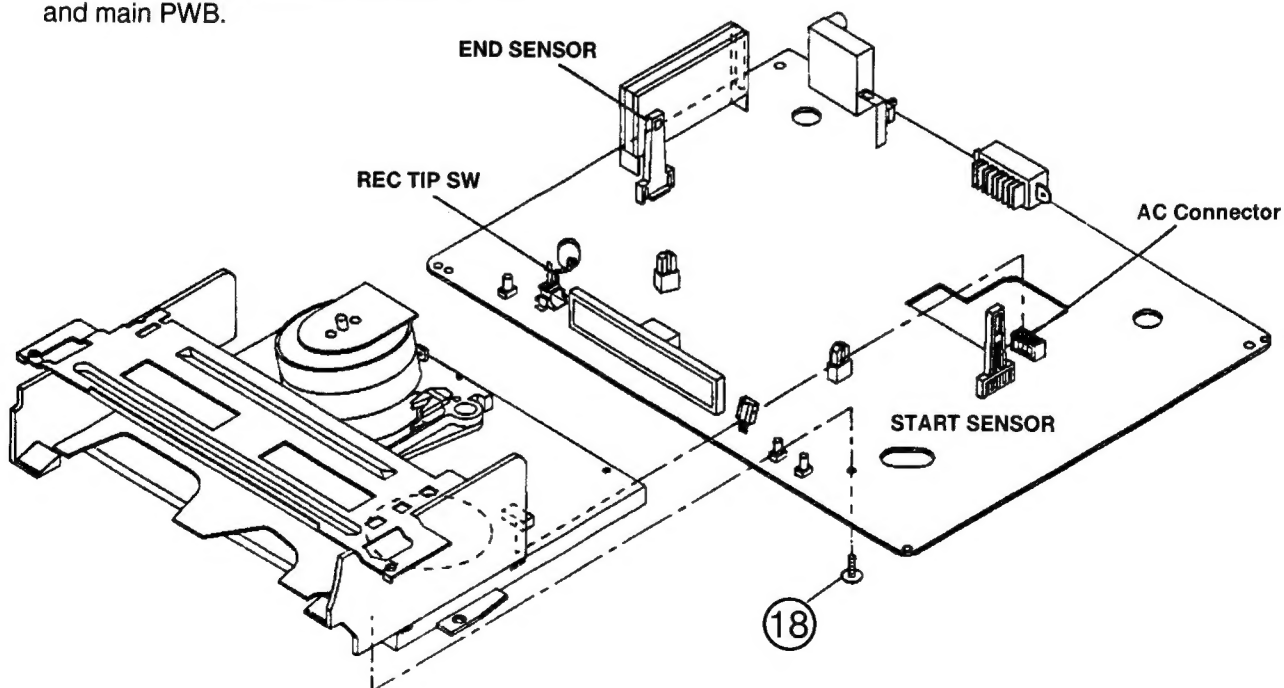
Tighten up the two screws (one for fixing the mechanism and the head amplifier shield, the other on the main PWB's soldering side and located near the loading motor) to fix the mechanism and main PWB. Reconnect the FFC cables (AA, AD and AH) and harnesses (AE and AL) between the mechanism and main PWB.

Parts to pay attention to:

Start and end sensors Q851, Q852

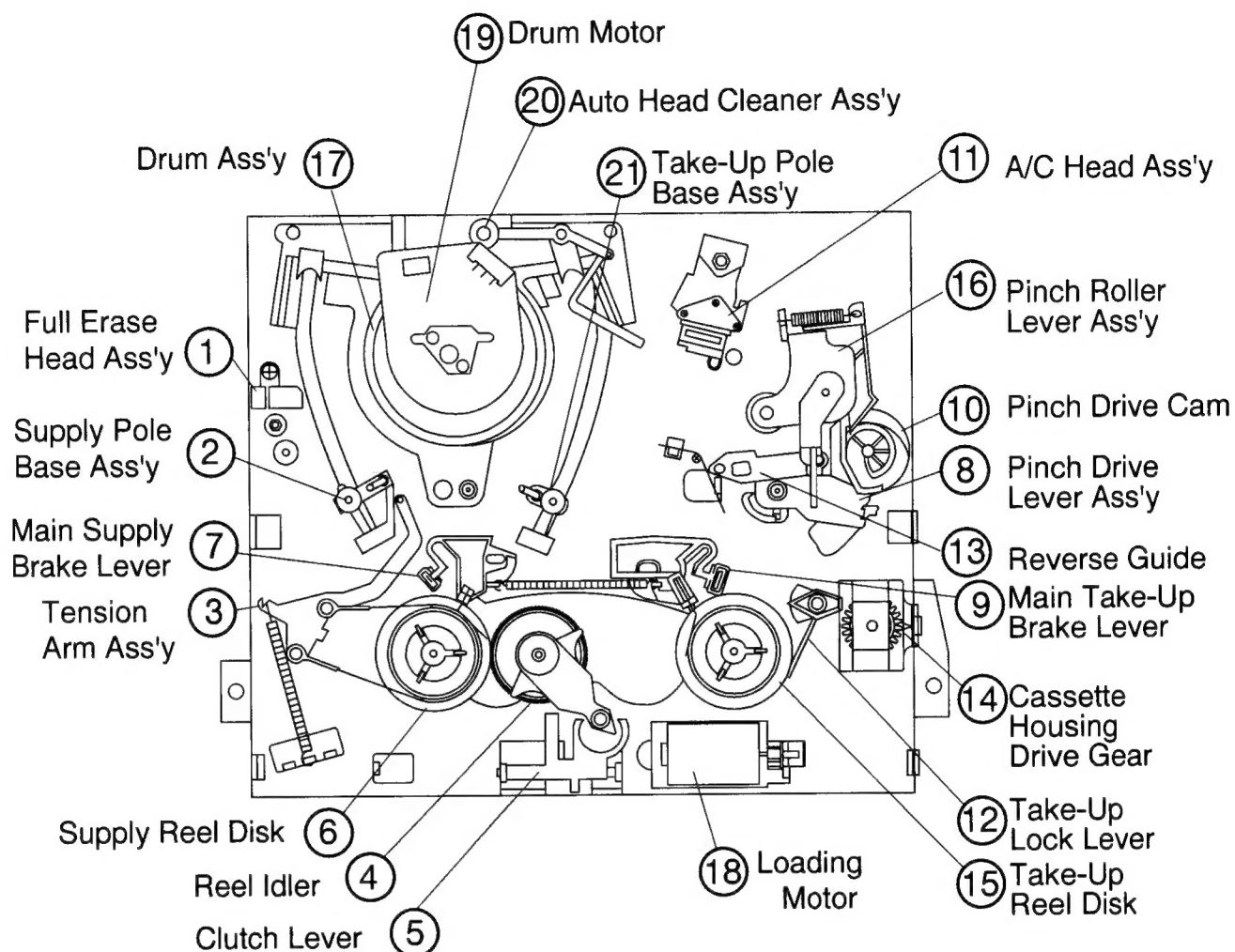
Record tip switch S851

Take special care of the MC-AC connector (board to board) between the mechanism and main PWB.



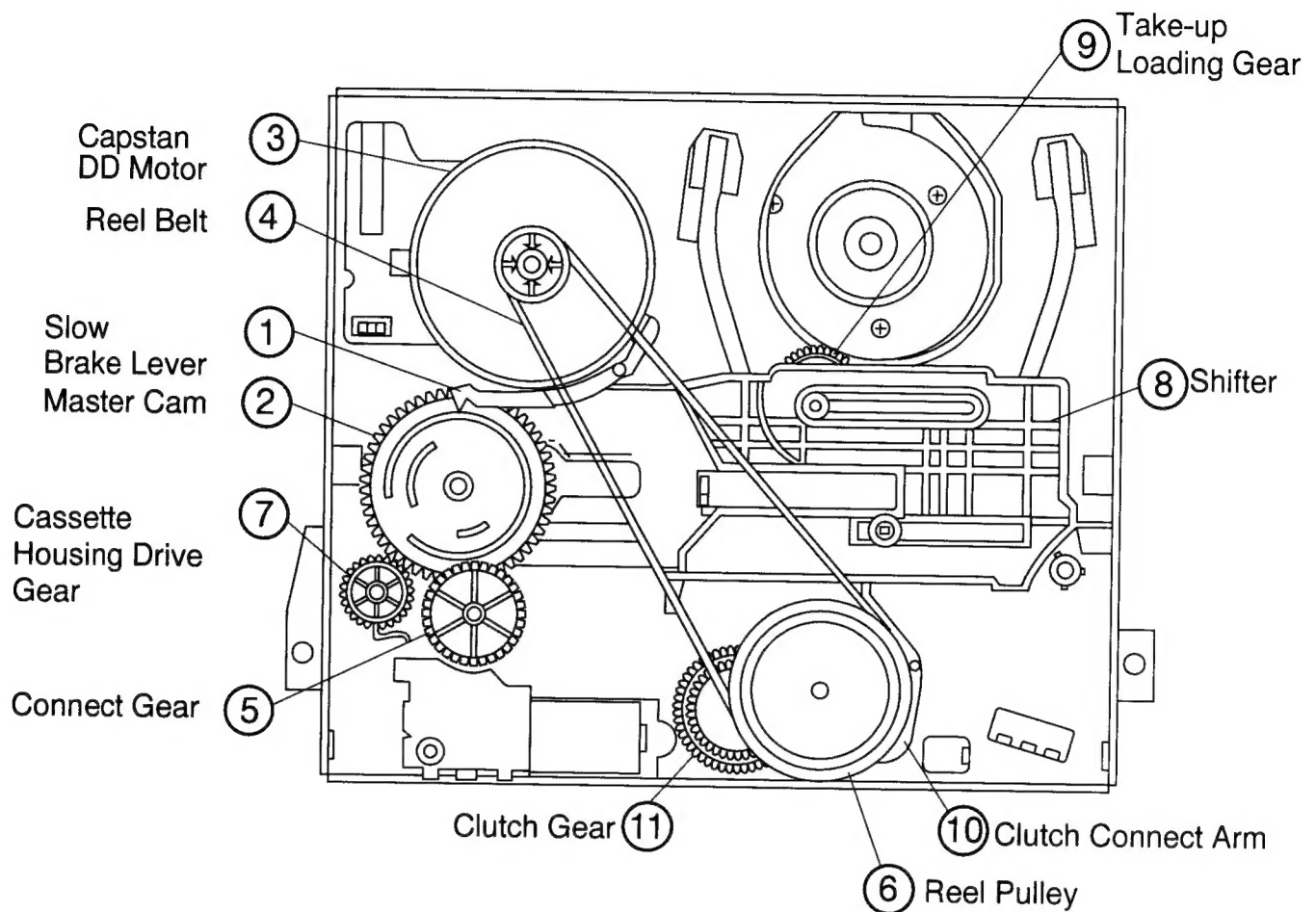


### 3. FUNCTION OF MAJOR MECHANICAL PARTS (TOP VIEW)



No.	Function	No.	Function
1.	Full erase head ass'y Erase the whole records on the tape in the recording mode.	13.	Reverse guide Pulls out the tape and controls the tape drive train height with the upper and lower guides.
3.	Tension arm ass'y Detects the tension of tape while running, and brakes the supply reel disk via the tension band.	16.	Pinch roller lever ass'y Press-fits the tape to the capstan during tape running. The right protrusion switches the clutch of the cassette housing control assembly in "tape eject", and makes the mechanism eject tape.
7.	Main supply brake lever Brakes the supply reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.	18.	Loading motor A motive power which drives the mechanism. It transmits the power to the master cam and cassette housing control assembly.
9.	Main take-up brake lever Brakes the take-up reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.		

## FUNCTION OF MAJOR MECHANICAL PARTS (BOTTOM VIEW)



No.	Function	No.	Function
1.	Slow brake lever Gets in contact with the capstan D.D. motor linking to the master cam in the slow still mode, and brakes it to a certain degree.	6.	Reel pulley Transmits the power of the capstan D.D. motor to the reel disk via the reel idler.
3.	Capstan D.D. motor A motive power which runs the tape. It transmits the power via the reel belt.	8.	Shifter Transmits the operation of the master cam to break and loading gear.
4.	Reel belt Transmits the power to run the tape to the reel pulley.	9.	Take-up loading gear Shifts the take-up pole base and guide roller via the loading relay gear, and applies the tape around the drum assembly, as well as transmits the power to the supply loading gear.







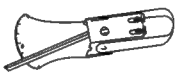
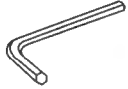
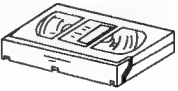

## 4. ADJUSTMENT, REPLACEMENT AND ASSEMBLY OF MECHANICAL UNITS



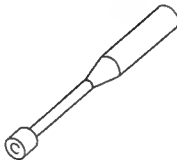

Here we will describe a relatively simple service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly replacement, for example).

We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original working condition.

### TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

No.	Jig Item	Part No.	Configuration	Remarks
1	Reel Disk Height Adjusting Jig	JiGRH0002		These Jigs are used for checking and adjusting the reel disk height.
2	Master Plane Jig	JiGMP0001		
3	A/C Head Tilt Adjusting Jig	9DAACH-A323U		This Jig is used for setting the A/C head tilt.
4	Torque Gauge (90g)	JiGTG0090		These Jigs are used for checking and adjusting the torque of take-up and supply reel disks.
	Torque Gauge (1.2kg)	JiGTG1200		
5	Gauge Head	JiGTH0006		
6	Cassette Torque Meter	JiGVHT-063		This cassette torque meter is used for checking and adjusting the torque of take-up for measuring tape back tension.
7	Tension Gauge (300g)	JiGSG0300		There are two gauges used for the tension measurements, 300 g and 2.0kg.
	Tension Gauge (2.0kg)	JiGSG2000		
8	Hex Wrench (0.9mm)	JiGHW0009		These Jigs are used for loosening or tightening special hexagon type screws.
	Hex Wrench (1.2mm)	JiGHW0012		
	Hex Wrench (1.5mm)	JiGHW0015		
9	Alignment Tape (PAL)	VROCPSV		These tapes are especially used for electrical fine adjustment.
11	Tension Gauge Adapter	JiGADP003		This Jig is used with the tension gauge. Rotary transformer clearance adjusting jig.

No.	Jig Item	Part No.	Configuration	Remarks
12	Special Bladed Screwdriver	JiGDRIVERH-4		This screwdriver is used for adjusting the guide roller height.
14	Torque Driver	JiGTD1200		This is used to screw down resinmade parts: the specified torque is 5kg.
15	Box Driver	JiGDRIVER110-7		This Jig is used for height adjustment of the A/C head and X-position.
		JiGDRIVER110-4		This Jig is used for replacement of the SI roller.
16	Reverse Guide Height Adjusting Jig	JiGRVGH-F18		This Jig is used for height adjustment of the reverse guide.

## MECHANICAL PARTS REQUIRING PERIODICAL INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts	Maintained	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	Possible symptom encountered	Remarks
Guide roller ass'y		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	Lateral noises Head occasionally blocked	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>		
Supply impedance roller (inner hole and shaft)			<input type="checkbox"/>		<input type="checkbox"/>		Clean with pure high quality isopropyl alcohol.
Supply impedance roller flange		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Clean tape contact part with the specified cleaning liquid.
Retaining guide		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Slant pole		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>		
Video head (upper drum ass'y)		<input type="checkbox"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	Poor S/N ratio, no colour	Clean tape contact area with the specified cleaning liquid.
Full-erase head		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	Poor colour, beating	
A/C head		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	Sound too small or distorted	
Lower drum ass'y						Poor flatness of the envelope with alignment tape	
Capstan D.D. Motor		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	No tape running, uneven colour	
Pinch roller		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	No tape running, tape slack	Clean rubber and rubber contact area with the specified cleaning liquid.
Reel belt			<input type="checkbox"/>		<input type="radio"/>	No tape running, tape slack, no fast forward/rewind motion	
Tension band ass'y					<input type="radio"/>	Cassette not loaded or unloaded	
Loading Motor					<input type="radio"/>		
Reel idler ass'y					<input type="radio"/>	No tape running	
Reel pully ass'y			<input type="checkbox"/>		<input type="checkbox"/>		
Clutch gear ass'y					<input type="radio"/>		
Main supply/take-up brake levers					<input type="radio"/>	Tape slack	
AHC (Automatic Head Cleaner) [VC-M40SM/M401SM]			<input type="radio"/>		<input type="radio"/>		Replace the roller of the cleaner when it wears down. Just change the AHC roller assembly for new one.

**NOTE:** ☐ : Part replacement.  
☐ : Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol).  
 : Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000hrs).

If the reading is out of the specified value, clean or replace the part.

## REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

### • Removal

1. Set the cassette ejected condition in the cassette eject mode.
2. Unplug the recorder from the main source.
3. Follow the procedures below in the specified order.
  - a) Remove the cassette housing installation screws ① and ②.
  - b) Slide and pull out the cassette housing control assembly upward.

### • Reassembly

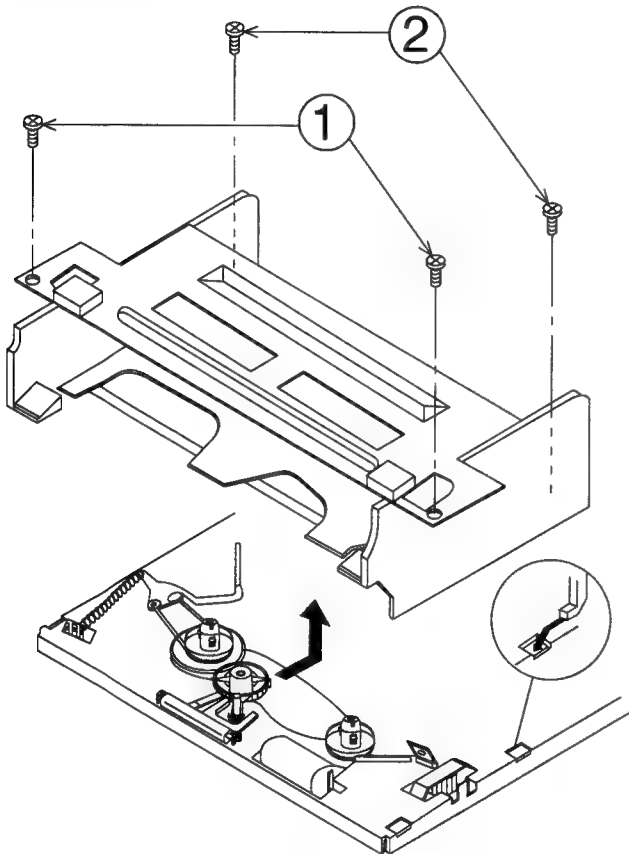


Figure 4-1.

1. Before installation of the cassette housing control assembly, make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Plug in the power cord. The cassette control drive gear starts and stops just when a tally mark appears in the mechanism chassis window. Align this tally mark with the cassette control drive angle's mark, as shown in Fig. 4-2, to position the cassette control on the mechanism chassis.

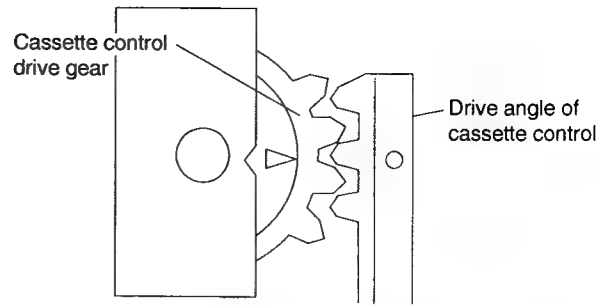


Figure 4-2.

2. Follow the procedures for removal in the reverse order.

### Notes:

- ① In using a magnet screw driver, be sure to keep it away from the A/C head, FE (Full Erase) head, or the drum.
- ② In removal and reassembly, take care not to hit the cassette housing control assembly or tools against the guide pin, drum, or the like thereabout.
- ③ Load the cassette once onto the cassette housing control assembly after reassembly.

## TO RUN A TAPE WITHOUT THE CASSETTE HOUSING CONTROL ASSEMBLY

1. Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor, before turning on the power.
2. Plug in the power cord.
3. Turn on the power switch.
4. Open the lid of a cassette tape by hand.
5. Hold the lid with two pieces of vinyl tape.
6. Set the cassette tape in the mechanism chassis.
7. Stabilize the cassette tape with a weight (500g) to prevent floating.
8. Perform running test.

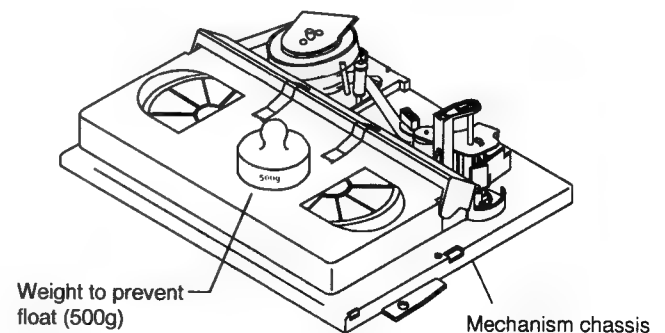


Figure 4-3.

### Note:

The weight should not be more than 500g.

## REPLACEMENT AND HEIGHT CHECKING AND ADJUSTMENT OF REEL DISKS

### • Removal (Supply and Take-up reel disks)

1. Remove the cassette housing control assembly.
2. Pull the tension band out of the tension arm.
3. Remove the supply main brake and the take-up main brake.
4. Open the hook at the top of the reel disk, and remove the reel disk.

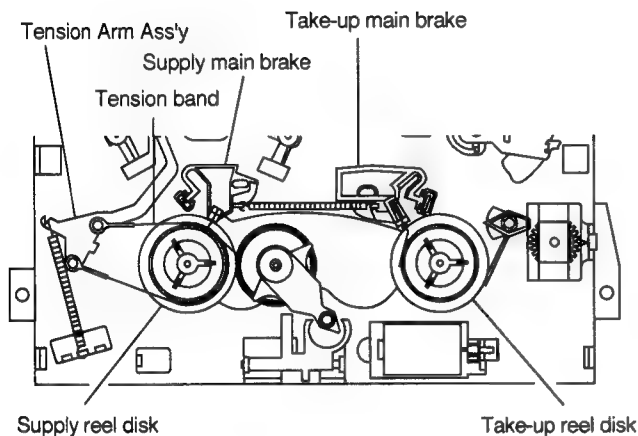


Figure 4-4.

### Note:

When the tension band is pressed in the direction of the arrow for removal, the catch is hard to be deformed.



Figure 4-5.

### • Reassembly (Supply reel disk)

1. Clean the reel disk shaft and apply oil to it.
2. Install a new supply reel disk onto the shaft.
3. Replace the tension band around the supply reel disk, and insert it to the hole of the tension arm.
4. Check the reel disk height and reassemble the supply main brake.

### Notes:

- ① Take enough care not to deform the tension band during installation of the supply reel disk.
- ② Be careful not to damage the supply main brake.

### • Reassembly (Take-up reel disk)

1. Clean the reel disk shaft and apply oil to it.
2. Install a new take-up reel disk onto the shaft.
3. Check the reel disk height and reassemble the take-up main brake.

### Note:

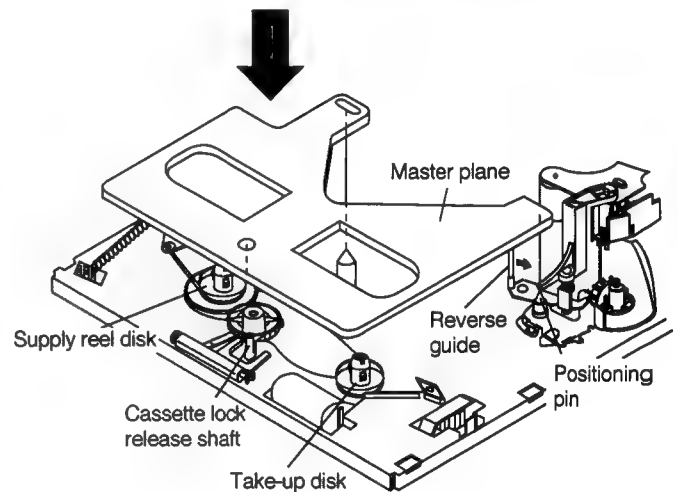
Take care not to damage the take-up main brake.

- \* After reassembly, check the video search rewind back tension (see page 20), and check the brake torque (see page 23).

### • Height checking and adjustment

#### Note:

Place the master plane onto the mechanism unit, taking care not to hit the drum (see Figure 4-6).



Set the master plane releasing the reverse guide by a finger.

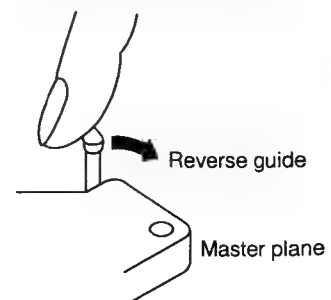


Figure 4-6.

- Check that the reel disk is lower than part A but higher than part B. If the height is not correct, readjust the reel disk height by changing the poly-slider washer under the reel disk.

**Note:**

Whenever replacing the reel disk, perform the height checking and adjustment.

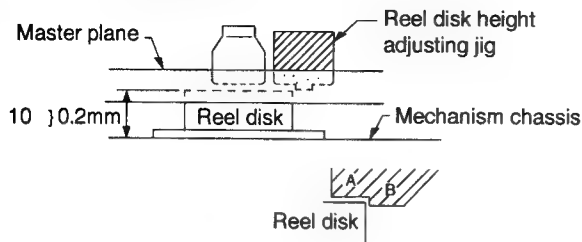


Figure 4-7.

## CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST FORWARD MODE

- Remove the cassette housing control assembly.
- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
- **Setting**
  1. Set a torque gauge to zero on the scale. Place it on the take-up reel disk.
  2. Press the FF button to set the mechanism to the fast forward mode.
- **Checking**
  1. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction.
  2. Check to see if the take-up torque is higher than 69 mN·m (700 gf·cm).

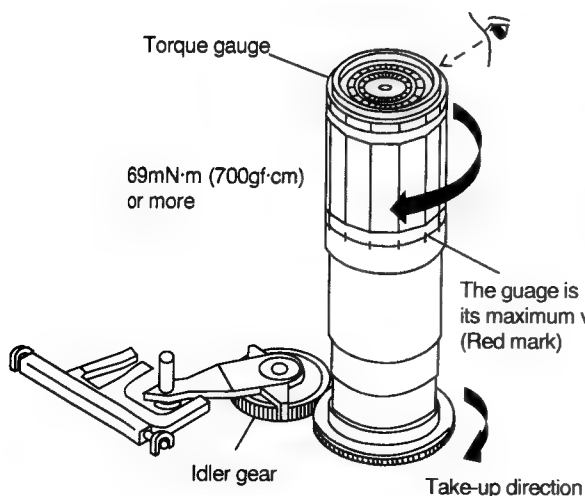


Figure 4-8.

## Adjustment

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the reel belt.

**Notes:**

1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

## CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

- Remove the cassette housing control assembly.
- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
- **Setting**
  1. Set a torque gauge to zero on the scale. Place it on the supply reel disk.
  2. Press the REW button to set the mechanism to the rewind mode.
- **Checking**
  1. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction.
  2. Check to see if the take-up torque is higher than 69 mN·m (700 gf·cm).

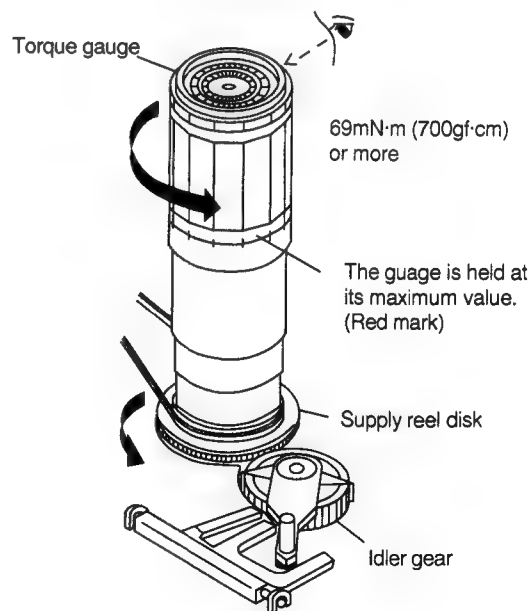


Figure 4-9.



- **Adjustment**

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the reel belt.

**Notes:**

1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

## CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN PLAYBACK MODE

1. Remove the cassette housing control assembly.
2. Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
3. Open the lid of the cassette torque meter, and hold it with two pieces of vinyl tapes.
4. Load the cassette torque meter into the unit.
5. Put the weight (500g) on the cassette torque meter.
6. Press the REC button to put the unit in REC mode.

- **Checking**

Set value SP  $8.8 \pm 3.8 \text{ mN}\cdot\text{m}$  ( $90 \pm 39 \text{ gf}\cdot\text{cm}$ )

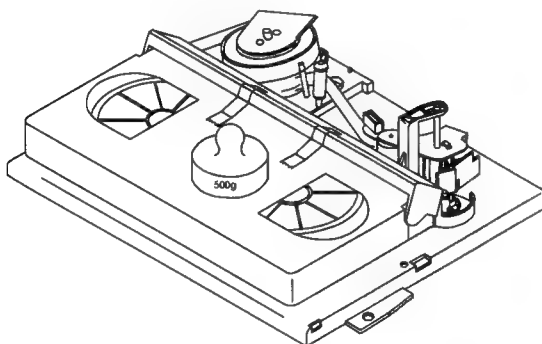


Figure 4-10.

1. Check that the torque is in the range of  $8.8 \pm 3.8 \text{ mN}\cdot\text{m}$  ( $90 \pm 39 \text{ gf}\cdot\text{cm}$ ).
2. The torque fluctuates due to the rotational deviation of the reel pulley ass'y. Use the center of the fluctuation as the value.
3. Place the ass'y in the SP record mode, and check that the take-up torque is within the range.

- **Adjustment**

If the take-up torque in the playback mode is outside the range, replace the reel pulley ass'y.

**Note:**

Stabilize the cassette torque meter to prevent floating.

## CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN VIDEO SEARCH REWIND MODE

- **Remove the cassette housing control assembly.**

- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**

- **Setting**

1. Push the PLAY button to place the ass'y in the playback mode.
2. Push the REW button to place the ass'y in the video search rewind mode.

- **Checking**

1. Place the torque gauge on the supply reel disk, and turn it counterclockwise very slowly (one rotation every 1 to 2 seconds) and check that the torque is within the set value  $14.5^{+8}_{-6} \text{ mN}\cdot\text{m}$  ( $148^{+80}_{-60} \text{ gf}\cdot\text{cm}$ )

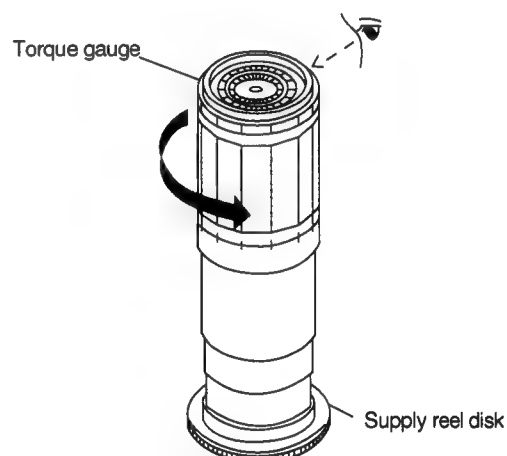


Figure 4-11.

**Note:**

Set the torque gauge securely on the supply reel disk. If it is not secure, the measurement will be incorrect.

- **Adjustment**

If the take-up torque in video search rewind mode is outside the range, replace the reel pulley ass'y.

**Note:**

The torque fluctuates due to the rotational deviation of the reel pulley ass'y. Use the center of the fluctuation at the value.

## CHECKING THE FAST FORWARD BACK TENSION

- Remove the cassette housing control assembly.
- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
- **Checking**
  1. Push the FF button to place the ass'y in the fast forward mode.
  2. Place the torque gauge on the supply reel disk, and turn it clockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is  $1.5 \pm 0.9 \text{ mN}\cdot\text{m}$  ( $15 \pm 9 \text{ gf}\cdot\text{cm}$ ).

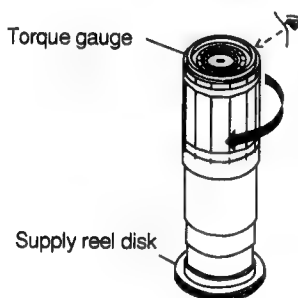


Figure 4-12.

### Notes:

- ① Set the torque gauge securely on the supply reel disk. If the torque gauge is not securely set on the reel disk, measurement will be incorrect.
- ② Measure the torque with the torque gauge's weight exerted on the reel disk.

## CHECKING THE REWIND BACK TENSION

- Remove the cassette housing control assembly.
- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
- **Checking**
  1. Push the REW button to place the ass'y in the rewind mode.
  2. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is  $1.3 \pm 0.8 \text{ mN}\cdot\text{m}$  ( $13 \pm 8 \text{ gf}\cdot\text{cm}$ ).

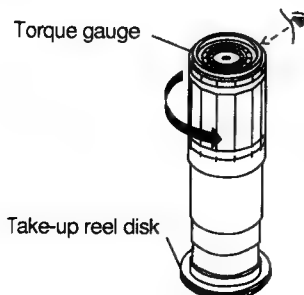


Figure 4-13.

### Notes:

- ① Set the torque gauge securely on the take-up reel disk. If it is not secure, the measurement will be incorrect.
- ② Measure the torque with the torque gauge's weight exerted on the reel disk.

## CHECKING THE VIDEO SEARCH REWIND BACK TENSION

- Remove the cassette housing control assembly.
- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
- **Checking**
  1. Push the PLAY button to place the ass'y in the playback mode.
  2. Push the rewind button to place the ass'y in the video search rewind mode.
  3. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within the set value  $4 \pm 1.7 \text{ mN}\cdot\text{m}$  ( $41 \pm 17 \text{ gf}\cdot\text{cm}$ ).

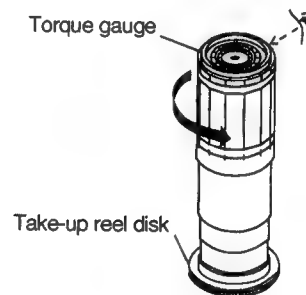


Figure 4-14.

### Notes:

- ① Set the torque gauge securely on the take-up reel disk. If it is not secure, the measurement will be incorrect.
- ② Measure the torque with the torque gauge's weight not exerted on the reel disk.

## CHECKING THE PINCH ROLLER PRESSURE

- Remove the cassette housing control assembly.
- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
- **Checking**  
Push the PLAY button to place the ass'y in the playback mode.

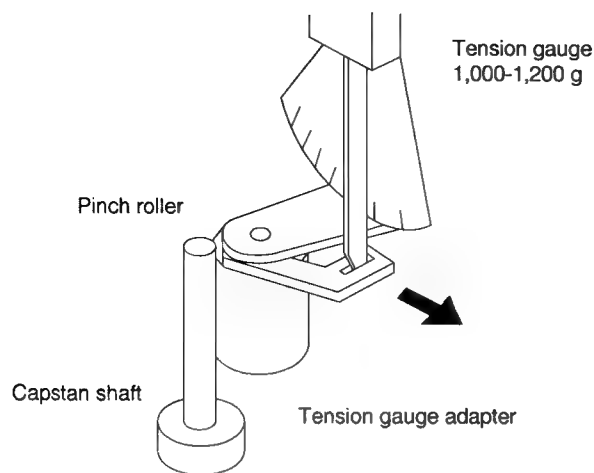


Figure 4-15.

1. Detach the pinch roller from the capstan shaft.
2. Set the tension gauge by hooking the tension gauge adapter onto the pinch roller shaft.
3. Gradually release the pressure to allow the pinch roller to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge.
4. Check that the reading of the tension gauge is in the range of 900 to 1200 g.

## CHECKING AND ADJUSTMENT OF TENSION POLE POSITION

- Remove the cassette housing control assembly.

- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.

### • Setting

1. Open the lid of cassette tape (E-180), and hold it with two pieces of vinyl tapes.
2. Load the cassette tape into the unit.
3. Put the weight (500g) on the cassette tape.
4. Make the adjustment with the beginning of a E-180 tape.

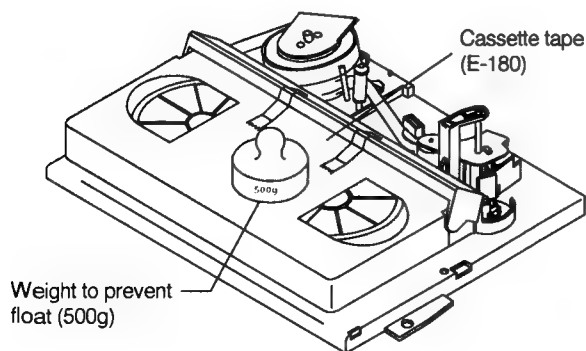


Figure 4-16.

### • Checking

1. Set a cassette tape, press the REC button and get the tape loaded. Now check the tension pole position.

2. Visually check to see if the left end of the tension pole is in alignment with the line 0.2 mm left of the center line of the SI roller. Readjust as required in the following steps.

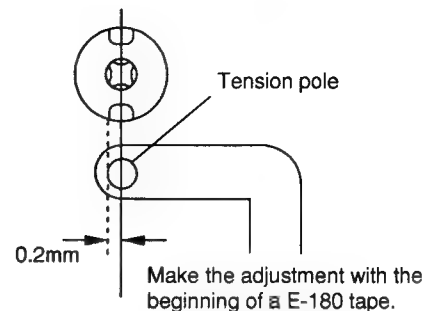


Figure 4-17.

- ① If the end is at the left from the dotted line:

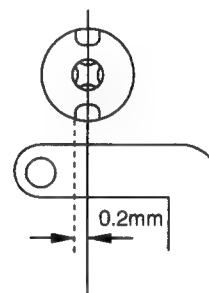


Figure 4-18.

1. Remove the cassette and press the REC button to make an empty loading. Put a bladed screwdriver into the tension band positioning cam and turn it clockwise.
2. Place the cassette in position and check the tension pole position.

- ② If the end is at the right from the dotted line:

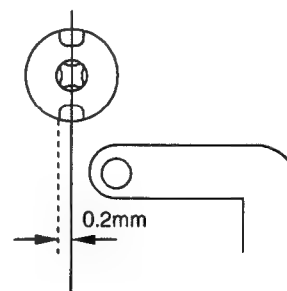


Figure 4-19.

1. Remove the cassette and press the REC button to make an empty loading. Put a bladed screwdriver into the tension band positioning cam to turn it counter-clockwise.
2. Place the cassette in position and check the tension pole position.

### Notes:

- ① The tension band positioning cam cannot be adjusted with a cassette in place because the cam will be located below the cassette. Repeat a series of steps; empty loading, adjustment, cassette placement and position checking.
- ② Turn the positioning cam clockwise to move the tension pole to the right (in the black-arrow direction). Turn it counterclockwise to move the tension pole to the left (in the white-arrow direction).

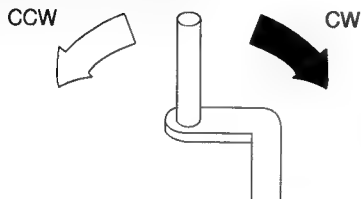


Figure 4-20.

- ③ Adjustable range of the tension pole positioning cam.

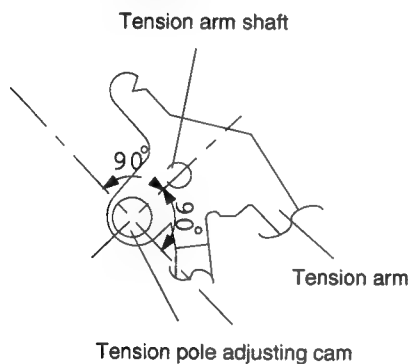


Figure 4-21.

Adjust the tension pole positioning cam so that the arrow mark on the cam be within 90° left and right from the tension arm shaft's center.

## CHECKING AND ADJUSTMENT OF RECORD/PLAYBACK BACK TENSION

- **Remove the cassette housing control assembly.**
- **Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.**
- **Setting**
  1. Open the lid of the cassette torque meter, and hold it with two pieces of vinyl tapes.
  2. Load the cassette torque meter into the unit.
  3. Put the weight (500g) on the cassette torque meter.

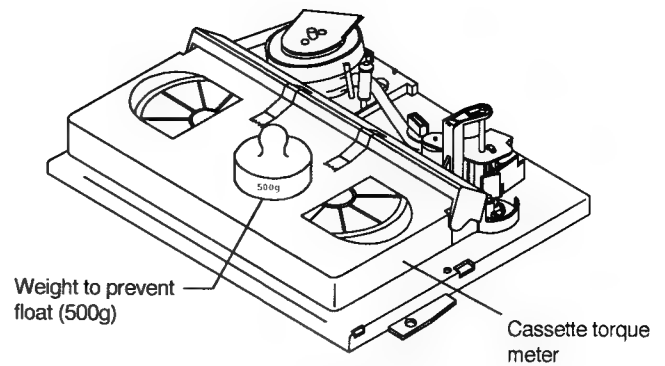


Figure 4-22.

### • Checking

1. Push the REC button to place the unit in the record mode.
2. Check that the back tension indicated by the gauge is within the set range 31 to 38 g·cm.

### Notes:

1. Make sure that the video cassette tape is over the retaining guide.
2. Make sure that the tape is not slack nor damaged at either end.

### • Adjustment

1. If the reading of the cassette torque meter is less than specified, move the tension spring hook toward A.
2. If the reading of the cassette torque meter is more than specified, move the tension spring hook toward B.

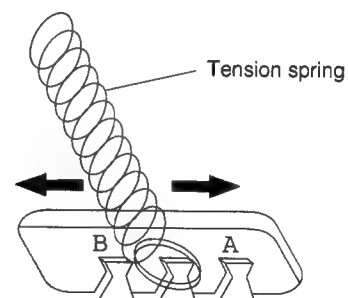


Figure 4-23.

## CHECKING THE BRAKE TORQUE

### • Checking the brake torque at the supply side

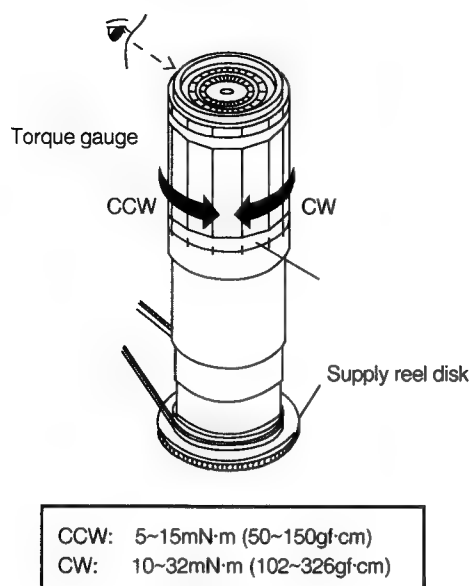


Figure 4-24.

### • Remove the cassette housing control assembly.

- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.

### • Setting

1. Set a torque gauge to zero on the scale. Place it on the supply reel disk.
2. Switch from the FF mode to the STOP mode.
3. Disconnect the AC power plug.

### • Checking

1. Slowly rotate the torque gauge in the clockwise (CW) direction and counterclockwise (CCW) direction of the supply brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CW direction = 10~32mN·m (102~326gf·cm), CCW direction = 5~15mN·m (50~150gf·cm), and that the brake torque in the CW direction is at least twice as high as that in the CCW direction.

### • Checking the brake torque at the take-up side

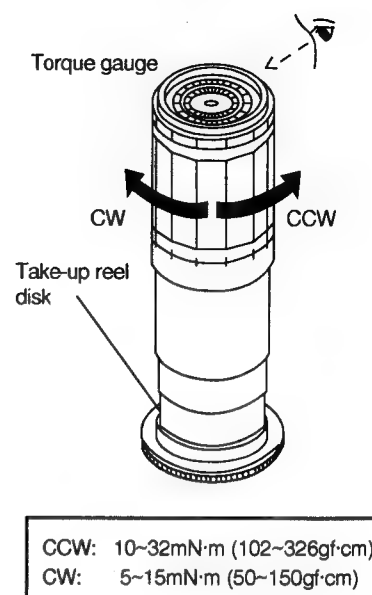


Figure 4-25.

### • Remove the cassette housing control assembly.

- Make a connection between TP5001 and TP5002, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.

### • Setting

1. Set a torque gauge to zero on the scale. Place it on the take-up reel disk.
2. Switch from the FF mode to the STOP mode.
3. Disconnect the AC power plug.

### • Checking

1. Slowly rotate the torque gauge in the clockwise (CW) direction and counterclockwise (CCW) direction of the take-up brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CCW direction = 10~32mN·m (102~326gf·cm), CW direction = 5~15mN·m (50~150gf·cm), and that the brake torque in the CCW direction is at least twice as high as that in the CW direction.

### • Adjustment of the brake torque at the supply side and the take-up side

1. If the supply or take-up brake torque is outside the range, clean the supply or take-up reel disk break lever pad, then recheck the torque.
2. If the supply or take-up brake torque is still outside the range, replace the main brake ass'y or the main brake spring.

### Note:

When the main brake is replaced, perform the height checking and adjustment of reel disks (see page 17), and the brake torque checking.

## REPLACEMENT OF A/C (Audio/Control) HEAD

1. Remove the cassette housing control assembly.
2. Place the unit in the unloading mode, and unplug the power cord.

### • Removal

1. Loosen the tilt adjusting screw ①.
2. Remove the azimuth adjusting screw ②.
3. Remove the A/C head screw ③.
4. Unsolder the A/C head PWB soldered to the A/C head assembly.

### Notes:

1. After replacement, be sure to perform the adjustment of the tape drive train (see page 26). Under any circumstances, avoid touching the head. Clean the head, if touched with your finger, with alcohol.
2. Take care that the azimuth spring does not fly off when removing the A/C head screw.

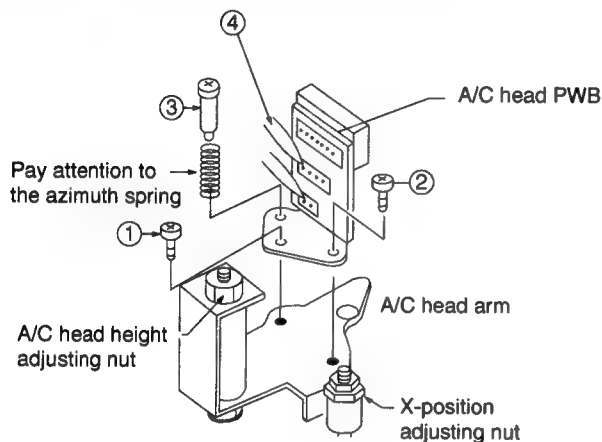


Figure 4-26.

### • Replacement

1. Solder the removed A/C head PWB onto a new A/C head assembly.
2. The A/C head assembly is attached so that the A/C head arm and A/C head plate are roughly parallel to each other.

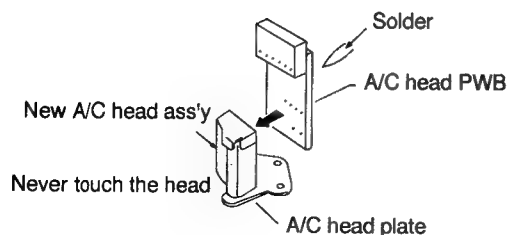


Figure 4-27.

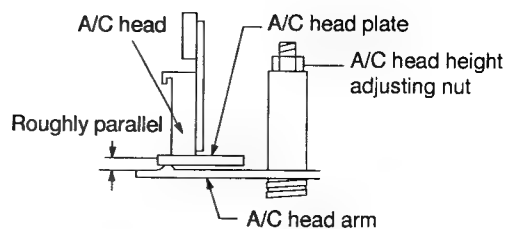
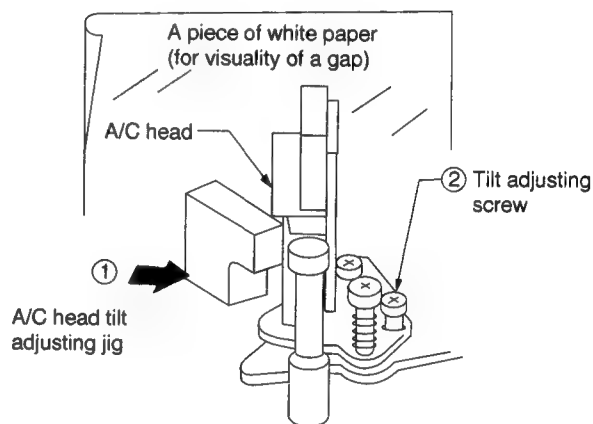


Figure 4-28.

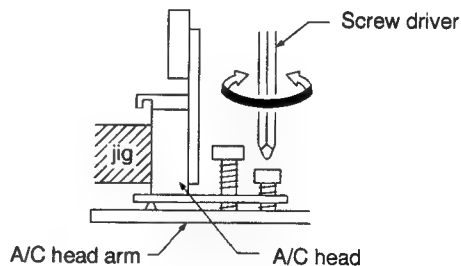
### • Adjustment

#### [A/C head tilt angle]

1. Set the mechanism to the loading mode.
2. Place the A/C head tilt adjusting Jig ①.
3. Slowly turn the tilt adjusting screw ② with a screw driver until there is no gap between the Jig and the A/C head.



(a)

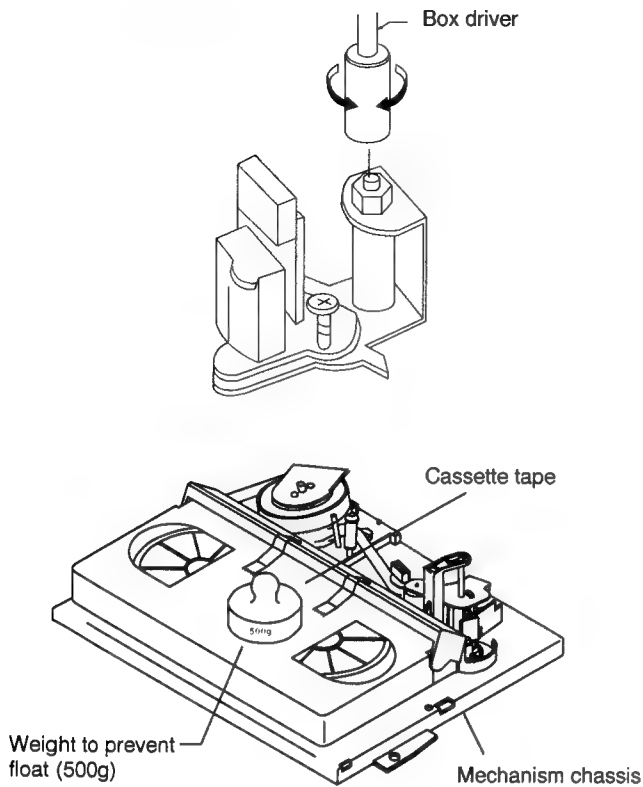


(b)

Figure 4-29.

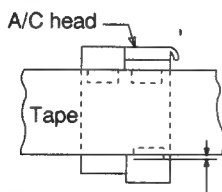
## [A/C head height rough adjustment]

### • Setting



- ① Roughly adjust the height of the A/C head by turning the A/C head adjusting hexagon nut with the specialized box driver until the tape is in the position shown below.
- ② Set the cassette tape to the mechanism chassis.
- ③ Press the PLAY button to put the unit in the playback mode.

### • Adjustment



Adjust the nut visually so that the control head is visible 0.3 to 0.5mm below the bottom of the tape.

Figure 4-30.

## HEIGHT ADJUSTMENT OF REVERSE GUIDE

### [Height adjustment of reverse guide]

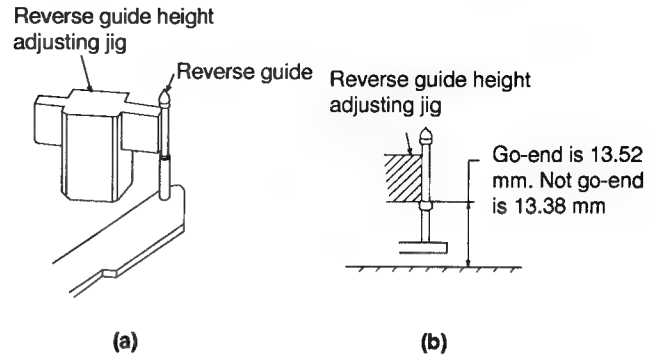


Figure 4-31.

1. In the tape load mode, make adjustment at the 13.38mm side first and then rotate the height adjusting nut by 1/6 turn counterclockwise.
2. Actually load the unit with a tape, put it in the play mode, and make sure the tape is free from wrinkles near the reverse guide.
3. Use a commercially available box driver to turn the height adjusting nut.

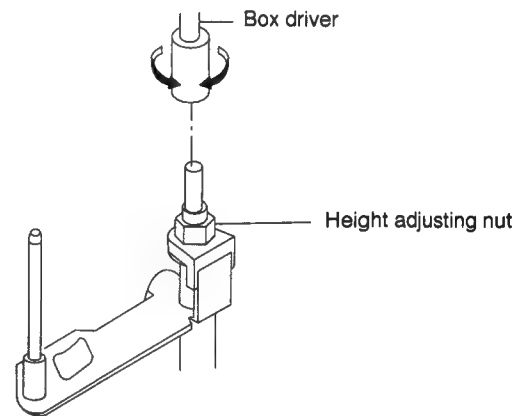


Figure 4-32.

## ADJUSTMENT OF TAPE DRIVE TRAIN

1. Remove the cassette housing control assembly.
2. Make a short-circuit between TP5005 and TP5006, both located at the center on your side on the main PWB, with a 22 ohm resistor. Now turn on the power.
3. Check and adjust the position of the tension pole. (See page 21.)
4. Check and adjust the video search rewind back tension. (See page 20.)
5. Set the tilt angle of the A/C head. (See page 24.)
6. Rough adjustment of tape drive train.
  - a) Connect the oscilloscope to the test point for PB CHROMA envelope output (TP301). Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP302).
  - b) Loosen the setscrew at the lower part of the guide roller, and adjust it with an adjusting screw driver (JIGDRIVERH-4) so that the guide roller turns smoothly. (Do not overloosen the setscrew, which causes insecurity of the guide roller.) (See Figure 4-33.)
  - c) Set the alignment tape (monoscope pattern) on the reel disk, and place the unit in the playback mode. (Place a 500 g weight on the cassette tape to prevent floating of the cassette tape.)

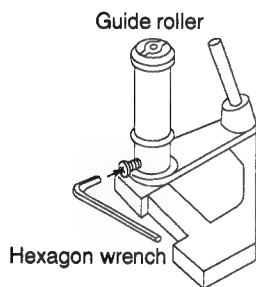


Figure 4-33.

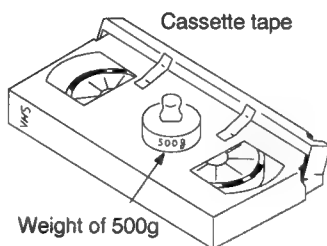


Figure 4-34.

- d) In the X value adjustment mode (see the Electrical Adjustment), change the envelope waveform from MAX to MIN, and MIN to MAX by pushing the (+) or (-) tracking button, and check a flat response is obtained on the waveform.
- e) If a flat response cannot be obtained, roughly adjust the guide rollers on the supply side and take-up side using an adjusting screw driver until a flat response can be obtained.
- f) Turn the A/C head tilt adjusting screw with a screwdriver to prevent the tape from wrinkling at the upper and lower flanges of the fixed guide.
  - 1) Wrinkles at the upper flange : Turn the above adjusting screw clockwise, as shown in Figure 4-35 (a).
  - 2) Wrinkles at the lower flange : Turn the above adjusting screw counterclockwise, as shown in Figure 4-35 (b).

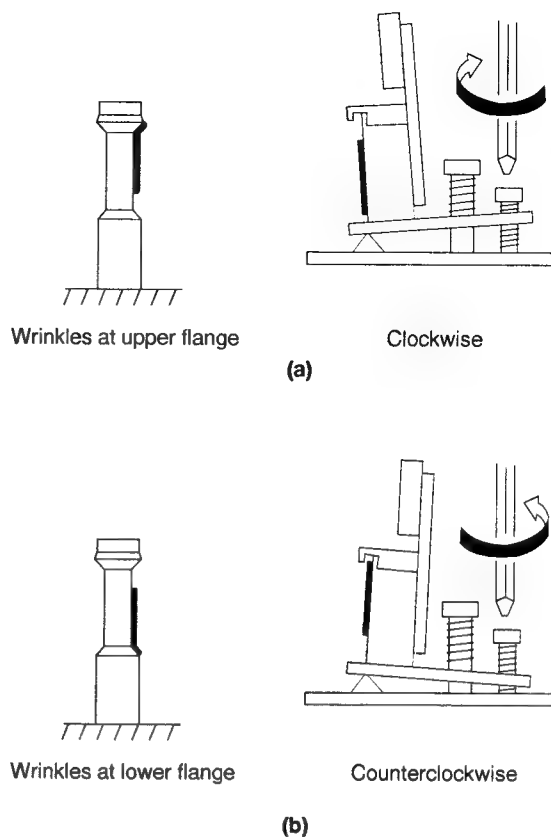


Figure 4-35.

### Notes:

1. Place the tracking control in the center position, and adjust the X-position adjusting nut so that the PB CHROMA envelope becomes maximum for easier rough adjustment of the tape drive train.
2. In the rough adjustment, pay particular attention to the outlet side.

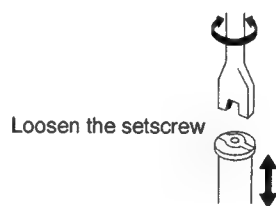


Figure 4-36.

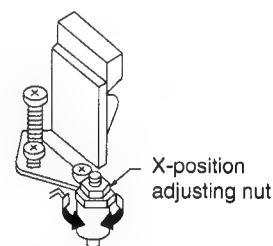


Figure 4-37.



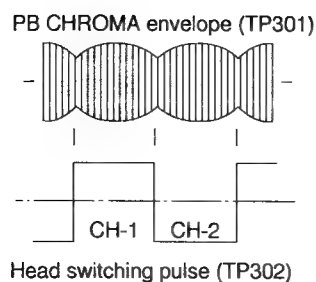


Figure 4-38.

7. Adjustment of A/C head height and azimuth

- Connect an oscilloscope to the audio output terminal.
- Use the alignment tape and play back its audio 6 kHz signal (monoscope pattern for video signal). Adjust the azimuth adjusting screw to obtain the maximum audio output on an oscilloscope. (See Figure 4-39.)
- Use the alignment tape and play back its audio 1 kHz signal (colour bar for video signal) and slowly rotate the A/C head height adjusting nut with the special box driver to obtain the maximum audio output.
- Perform the adjustment in b) again.
- After this adjustment, apply glyptal to the screws and nuts to fix them.

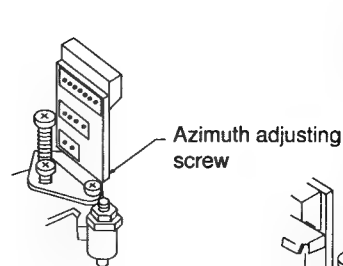


Figure 4-39.

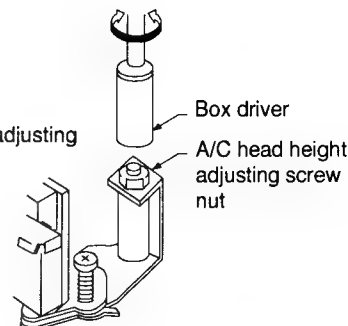


Figure 4-40.

8. Adjustment of tape drive train and X-Position.

- Connect the oscilloscope to the test points (TP301) for PB CHROMA envelope output. Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP302).
- Play back the tape drive train alignment tape.
- Push the (+) or (-) button to change the envelope waveform from MAX to MIN, and MIN to MAX. Adjust the guide roller's height on the supply and take-up sides with an adjusting screw driver, to obtain an envelope waveform that is as flat as possible.
- If the tape is above or below the helical lead, the PB CHROMA waveform will take the shape shown in Figure 4-41.
- Adjust for maximum flatness of the envelope as the step 6, e) in page 24.

	When the tape is above the helical lead.		When the tape is below the helical lead.	
	Supply side	Take-up side	Supply side	Take-up side
Adjustment	Supply side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Take-up side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Supply side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The supply side guide roller is then rotated in the clockwise direction to flatten the envelope.	Take-up side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The take-up side guide roller is then rotated in the clockwise direction to flatten the envelope.

Figure 4-41.

- f) Push the (+) or (-) tracking button to check that a flat response is obtained on the envelope waveform.
  - g) Secure the guide roller by tightening the guide roller setscrew in the unloading mode.
  - h) Play back the tape drive train alignment tape to check that the envelope waveform does not change.
9. Adjustment of A/C head X-position.
- a) In the X value adjustment mode (see the Electrical Adjustment), make a short-circuit between TP5005 and TP5006, both located at the center on your side on the main PWB, with a 22 ohm resistor to center the tracking.
  - b) Rotate the X-position adjusting nut with an adjusting box driver, and adjust the A/C head position for maximum head switching pulse low side envelope.
  - c) Adjust the playback switching point.
  - d) Check the flatness of the envelope waveform and sound by playing back a recorded tape.

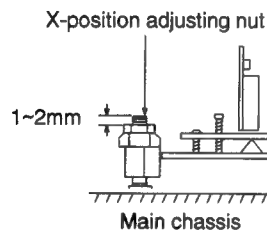


Figure 4-42.

## REPLACEMENT OF THE CAPSTAN D.D. (DIRECT DRIVE) MOTOR

- Remove the cassette housing control assembly.

- Removal (Follow the order of indicated numbers.)

1. Disconnect from the board-to-board connector on the main PWB.
2. Remove the reel belt ①.
3. Remove the screws ②.

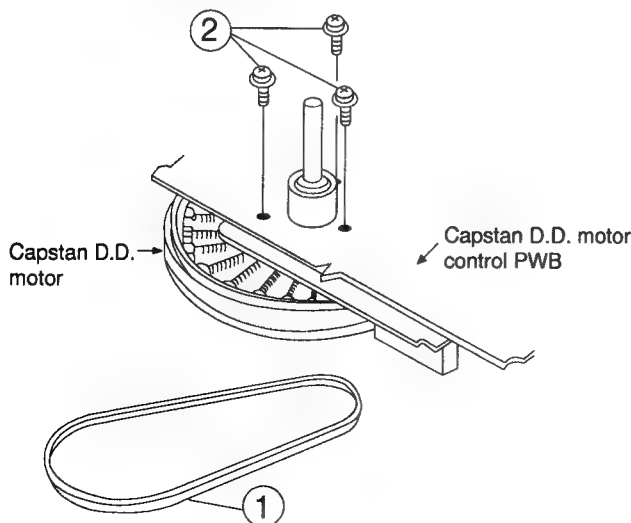


Figure 4-43.

## • Reassembly

1. Mount the capstan motor on the mechanism chassis making sure not to allow the capstan shaft to hit the mechanism chassis, and attach it with the three screws.
2. Attach the reel belt. Reconnect to the board-to-board connector on the main PWB.

## Notes:

1. After installing the capstan D.D. motor, be sure to rotate the capstan D.D. motor and check the movement.
2. Check the servo circuit.

## REPLACEMENT OF DRUM D.D MOTOR

1. Put the unit in the cassette eject position.
2. Unplug the power cord.

## • Removal (Reverse the order in reassembly.)

1. Disconnect the FFC cable ①.
2. Unscrew the stator assembly fixing screws ②.
3. Take out the stator assembly ③.
4. Unscrew the rotor assembly fixing screws ④.
5. Take out the rotor assembly ⑤.

## Notes:

1. In removing the stator assembly, part of the drum earth spring pops out of the pre-load collar. Be careful not to lose it.
2. Secure the rotor assembly so that the installation positioning holes in the rotor assembly and upper drum assembly match. (Match the upper drum's notch with the rotor's hole.)
3. Be careful not to damage the upper drum or the video head.
4. Be sure that the hall device and the stator assembly are not damaged by the rotor assembly or other parts.
5. After installation, adjust the playback switching point.

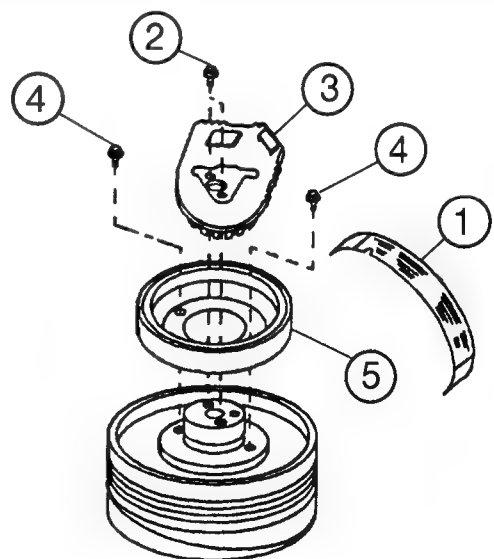


Figure 4-44

## REPLACEMENT OF UPPER DRUM

(2-head/4-head drum models are applicable here. Hi-fi models are equipped with an upper-and-lower drum assembly.)

Note:

The gap between the lower drum and the upper drum is very accurate, in order of microns, and care should be paid to their replacement. Even a slight amount of foreign material will affect the accuracy of their reassembly.

### Replacement (Follow the order of the indicated numbers.)

1. Remove the drum earth brush and its spring 1.
2. Put a mark for the direction of the pre-loaded collar and the drum shaft 2.
3. Loosen the set screws (M4) 3 of the pre-loaded collar. Take out the pre-loaded collar upward.
4. Pull up the upper drum 4 out of position.

Note:

1. Remove the drum motor, referring to the drum motor replacement.
2. Put a mark, with marking pen or the like, in order to identify the direction of the pre-load collar and the drum shaft. Now remove the pre-load collar.
3. Be careful not to lose the drum earth brush and drum earth brush spring. Handle the brush with care not to allow any dust and foreign matters on it.
4. Avoid touching the drum surface with bare hands.
5. Pull out the upper drum with care so that it may not be tilted.
6. Do not hit the screws when tightening them.

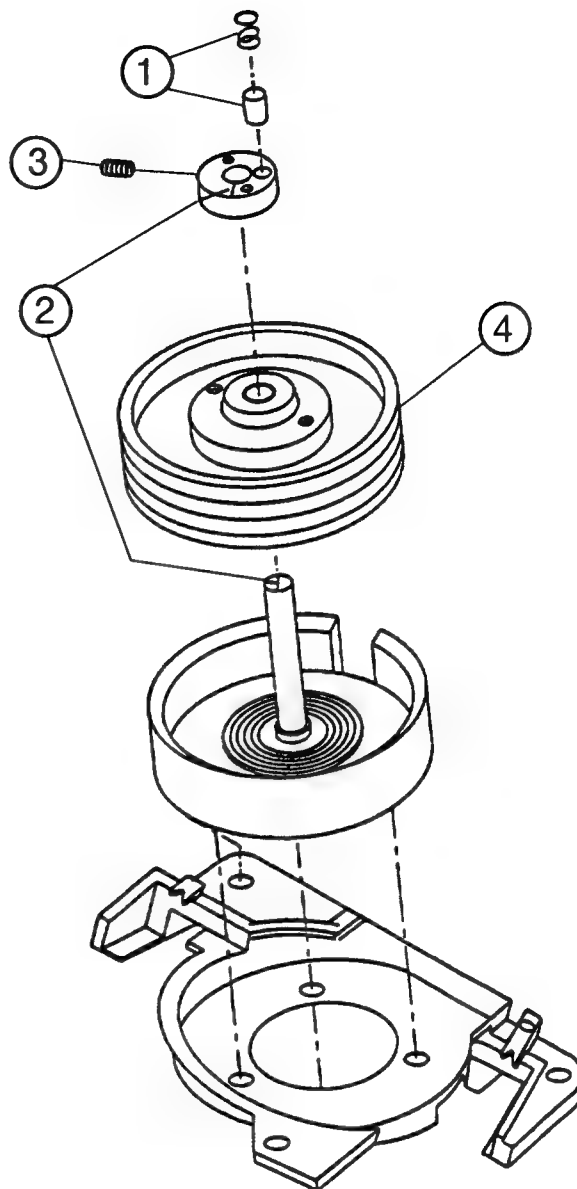


Figure 4-44(a)

### Drum replacement (for 2/4 drums; drum assembly supplied for Hi-Fi models)

1. Clean up the drum shaft.
2. Make a clearance at the rotary transformer. This is an important procedure to maintain the performance.
  - 1) Some rotary performance shims are packaged in the servicing upper drum assembly or lower drum assembly. Install the thinnest (0.06mm) of the shims onto the lower drum shaft. (Refer to Fig.4-44(b) for thickness).
  - 2) Install the upper drum assembly onto the drum shaft.
  - 3) Install the pre-load collar.
  - 4) Exert a force of 14.7N (1.5 kgf) on the pre-load collar from above (using a commercially available load meter). Tighten up the set screws (M4) of the pre-load collar.
  - 5) Turn the upper drum by hand and listen to see if the rotary transformer gives no rubbing sound.
  - 6) If the transformer sounds, replace the installed shim with the next thicker shim.
  - Take the above steps 1) through to 5) until no rubbing sound is heard any longer.
  - 7) Make sure no rubbing sound is heard. Finally add the 0.03mm thick shim.
3. Place the pre-load collar back in position in the direction marked in disassembling. (See Fig. 4-44(a) for setting)..
4. Exert a force of 14.7N (1.5 kgf) upon the pre-load collar from above. Tighten up the set screws of the pre-load collar (1.18Nm (12kgf-cm) ).
5. Place the drum earth brush, drum earth brush spring and drum motor back in position.
6. After replacement, be sure to check the tape drive train adjustment (See page 22) and the following electrical adjustments.
  - Adjustment of the playback switching point.
  - Checking and adjustment of the X-position.
  - Adjustment of SP and LP slow tracking preset.

### Precautions in drum replacement

1. The drum assembly is very delicate. Handle it with care.
2. Be certain that the drum surface is free from dust, dirt and other foreign matters.
3. Carefully adjust the rotary transformer clearance, because this adjustment is important in order to maintain the performance.
4. Install the upper drum straight down to the drum shaft. Do not apply any excessive force upon the upper drum.

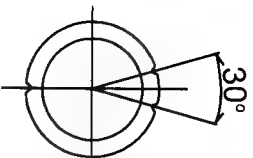
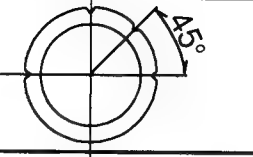
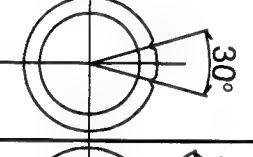
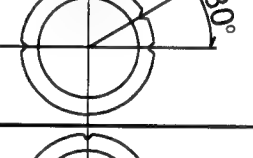
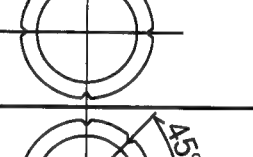
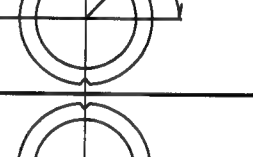
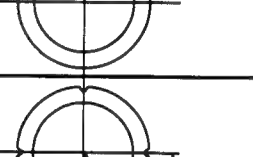


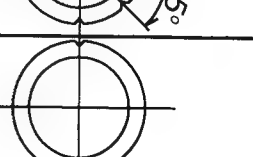
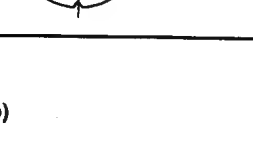
No.	Thickness (mm)	Shape
1	t=0.080	
2	t=0.090	
3	t=0.100	
4	t=0.110	
5	t=0.120	
6	t=0.130	
7	t=0.140	
8	t=0.150	
9	t=0.160	
10	t=0.170	
11	t=0.180	

Figure 4-44(b)

## ASSEMBLE THE MECHANISM'S PARTS REQUIRING THE PHASE MATCHING IN THE STEPS BELOW.

1. Assembling the pinch roller assembly and the pinch drive cam (on the front of the mechanism chassis).
2. Mounting the shifter (on the back of the mechanism chassis).
3. Mounting the master cam (on the back of the mechanism chassis).
4. Mounting the connection gear, slow brake and loading motor assemblies (on the back of the mechanism chassis).

### 1. Assembling the pinch roller assembly and the pinch drive cam (on the front of the mechanism chassis).

Place the following parts in position in numerical order.

- (1) Pinch drive cam ①
- (2) Pinch roller and pinch double-action lever ②
- (3) Open lever ③

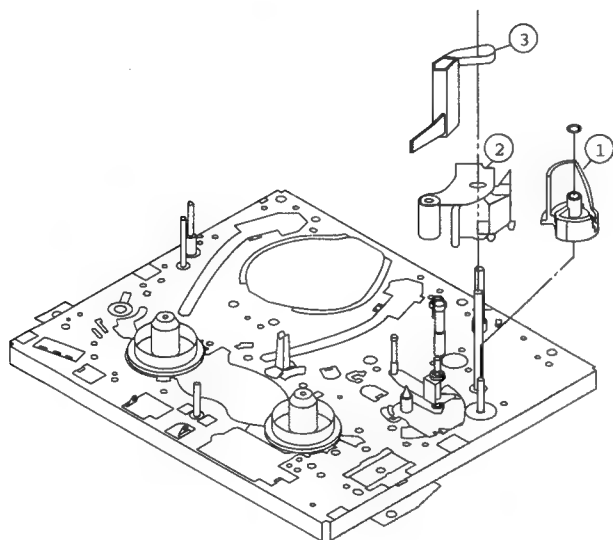
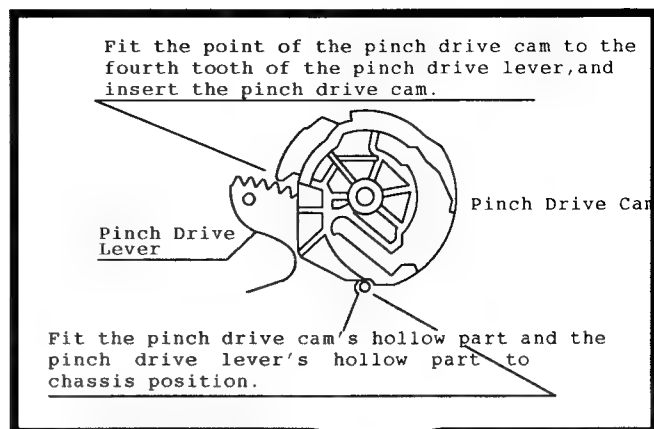


Figure 4-45.

### ① Insert Pinch Drive Cam.



Phase Matching Point ①

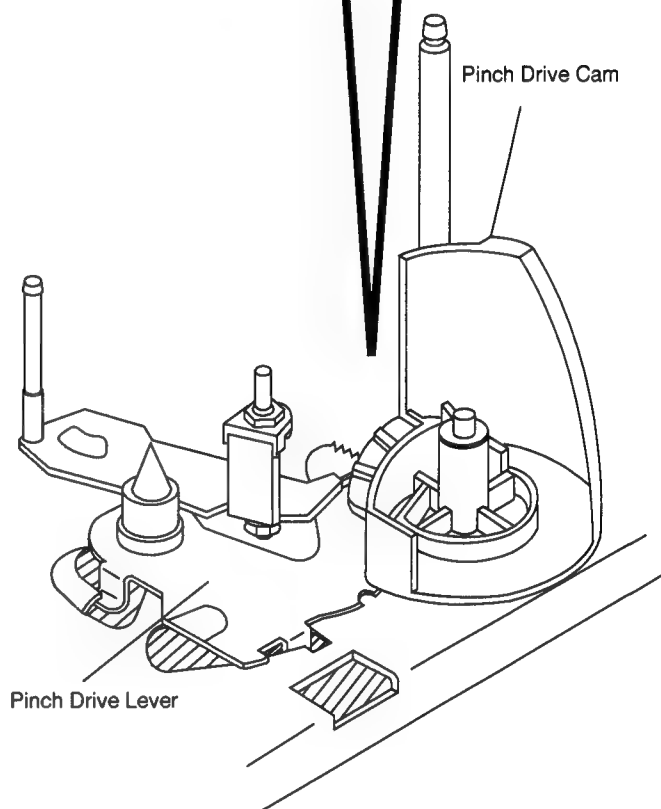


Figure 4-46-1.

② Insert Pinch Roller/Pinch Double Action Lever Ass'y.

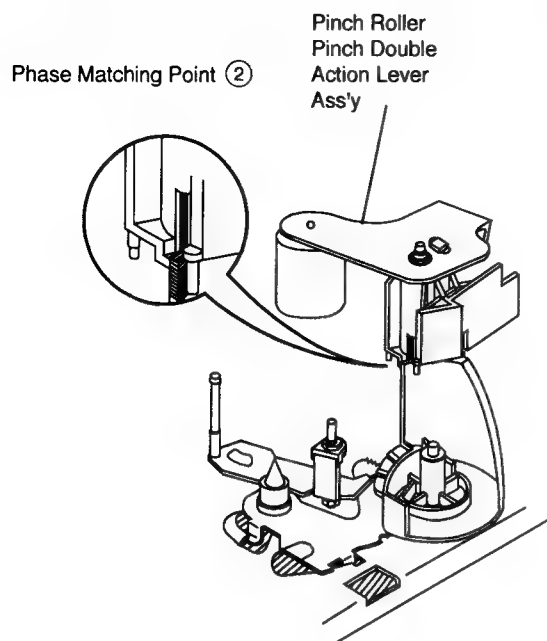


Figure 4-46-2.

③ Insert Open Lever.

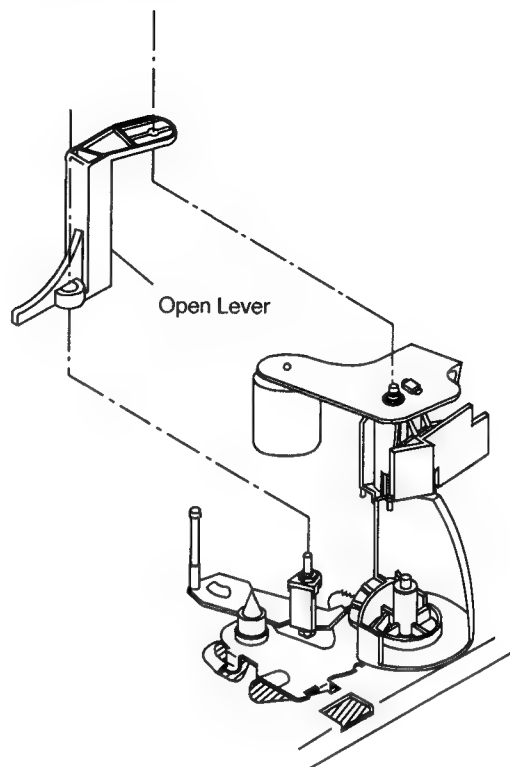


Figure 4-46-3.

## 2. Mounting the shifter (on the back of the mechanism chassis).

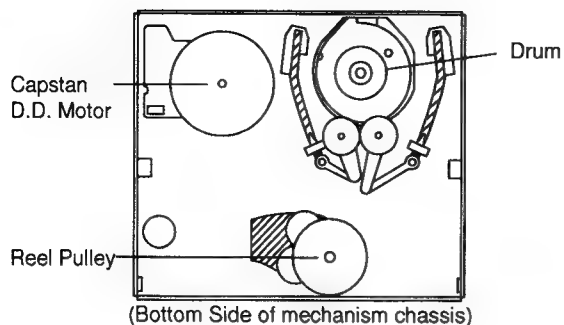


Figure 4-47.

1. Make sure that the loading gear is at the point (1) as shown below.
2. Place the shifter in position, keeping in mind the 7 insertion points and the five relief points.
3. For the phase matching at the insertion point (1), see the point (2) as shown below.
4. Finally fix the shifter with two washers located on insert points ① and ⑥.

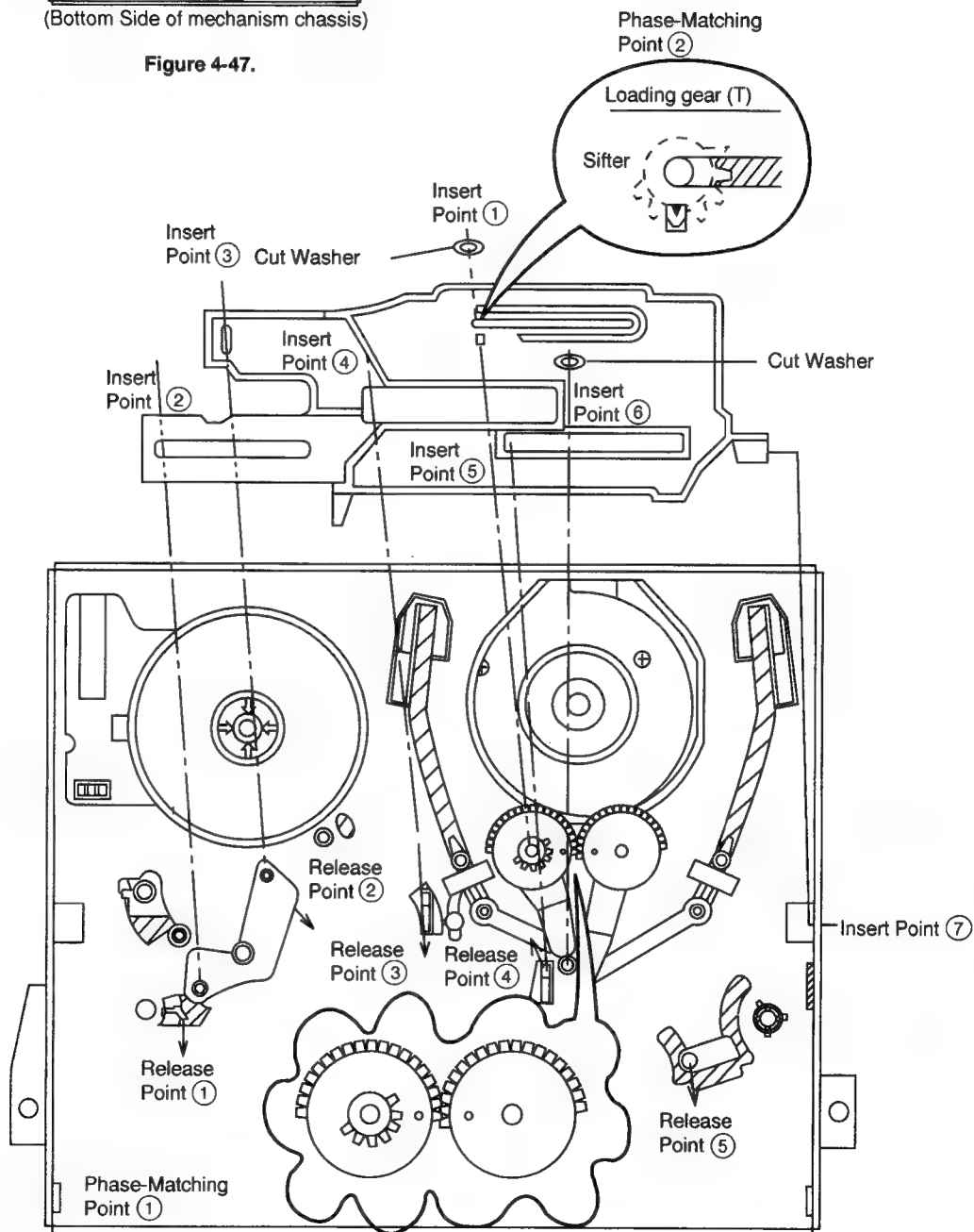


Figure 4-48.

### 3. Mounting the master cam (on the back of the mechanism chassis).

- (1) Make sure beforehand that the shifter is at the point as shown below.
- (2) Place the master cam in the position as shown below.

#### Note:

See the figure below for the phase matching between the master cam and the cassette control drive gear.  
(3) Finally fix the master cam with E ring.

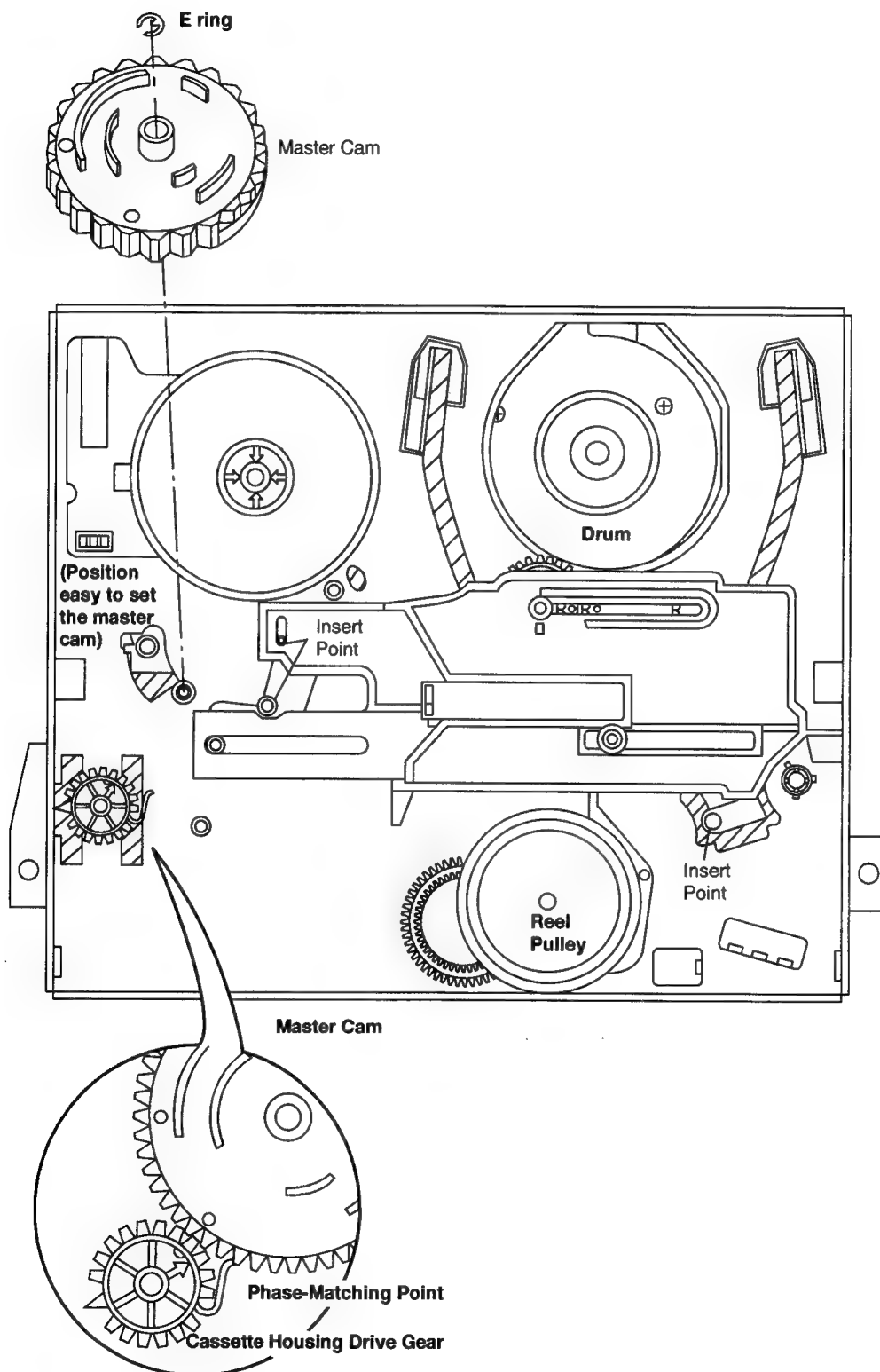


Figure 4-49.



#### 4. Mounting the connection gear, slow brake and loading motor assemblies (on the back of the mechanism chassis).

- (1) Assemble the connect gear.
- (2) Assemble the slow brake.
- (3) Assemble the loading motor unit.

**Note:**

Let the slow brake leg out of the front of the mechanism chassis. Catch the spring to the take-up fixing guide that is at the left of the A/C head.

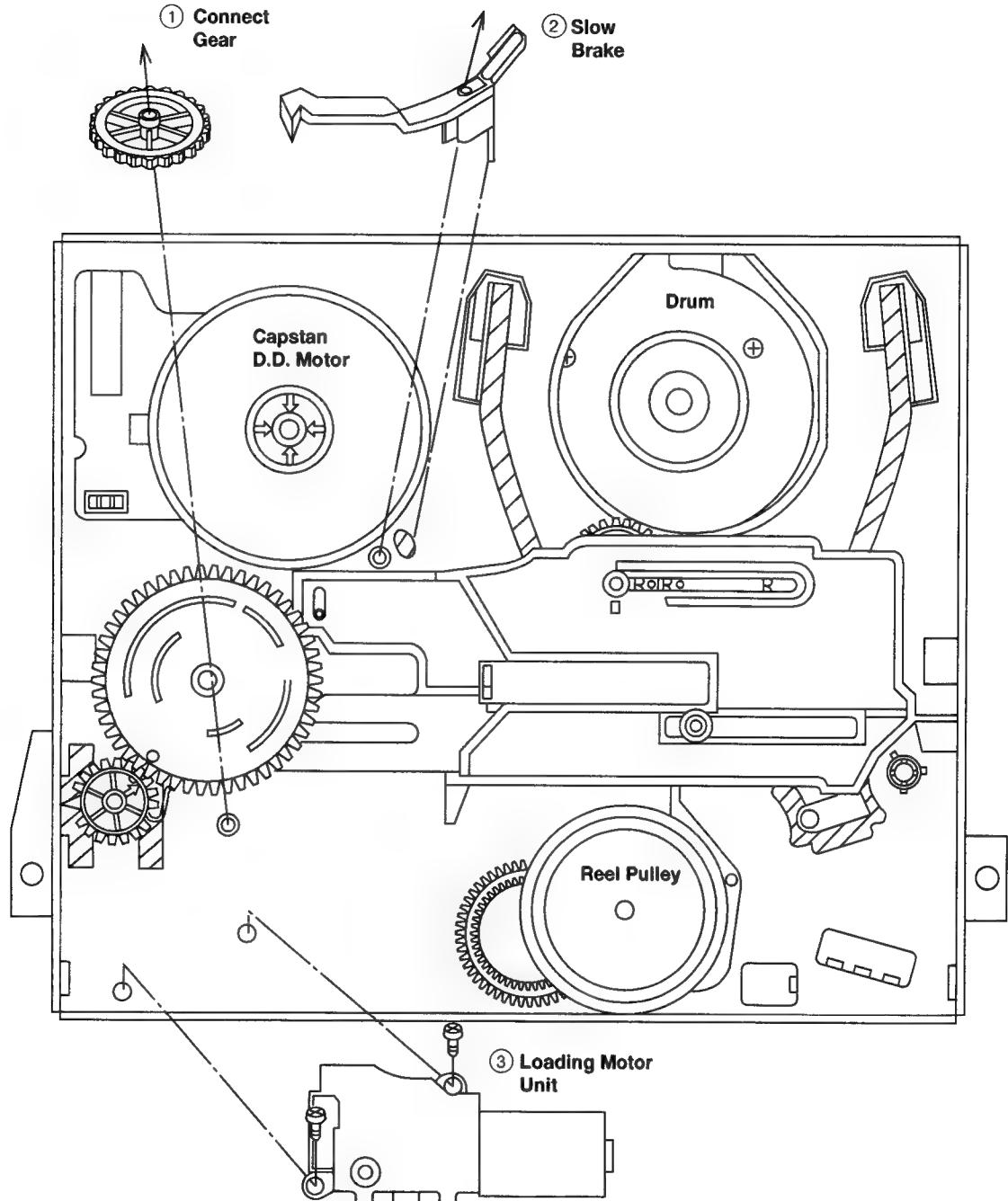


Figure 4-50.

**Note:**

Before setting up the loading motor, make sure the phase is matched. To do so, turn the connection gear clockwise and check to see if the loading is complete and if the pinch roller comes into contact.

When these actions are made smoothly, return the mechanism to the state as shown above. Finally mount the loading motor unit.

## REPLACEMENT OF LOADING MOTOR

### • Removal

Remove 2 screws.

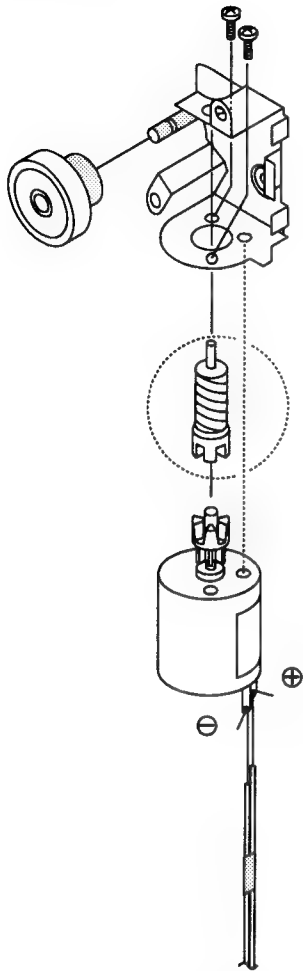


Figure 4-51.

### • Replacement

- ① Take out the old loading motor. Place a replacement loading motor as shown above (Figure 4-51.).

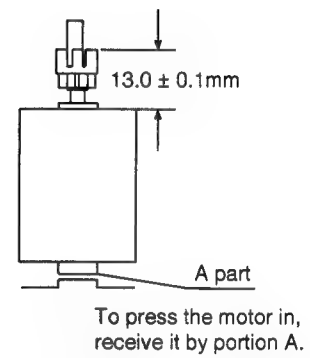
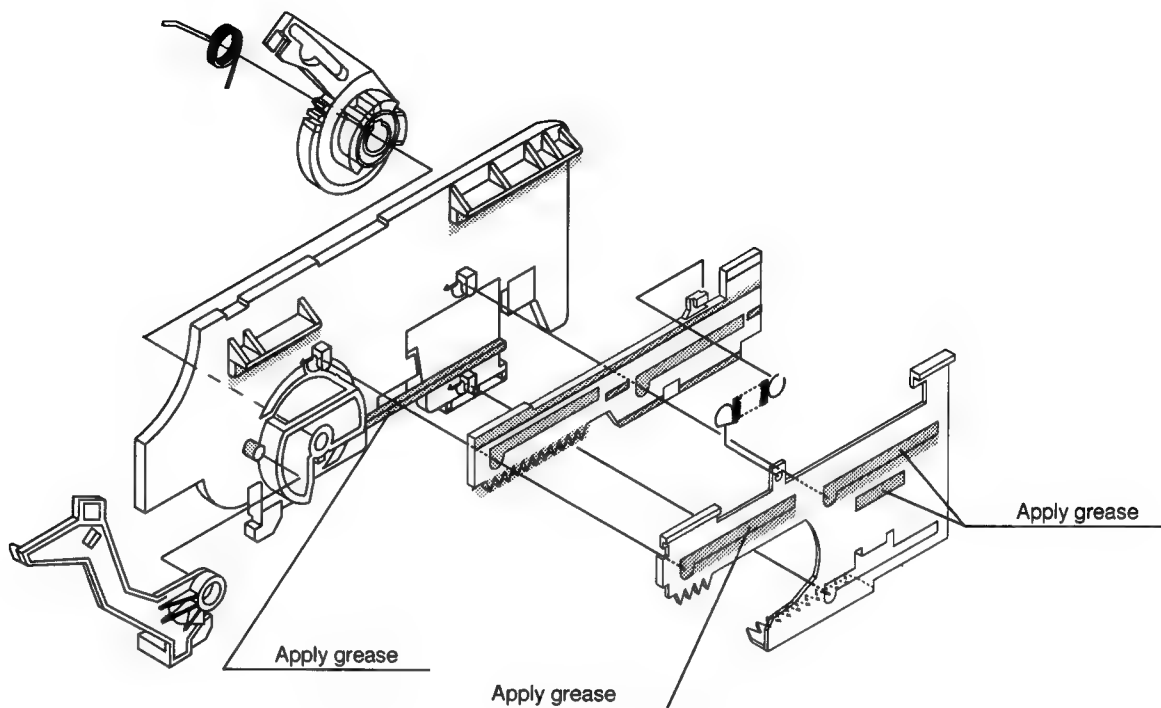


Figure 4-53.

Press-fit the loading motor pulley with a force of less than 98N (10 kgf). Be sure that the pulley is  $13.0 \pm 0.1$  mm away from the motor.

## ASSEMBLY OF CASSETTE HOUSING

### ① Drive Gear R and Drive Angle Ass'y



#### Phase Matching Point

- Fix the drive angle ass'y to the drive gear Ras shown in the figure.

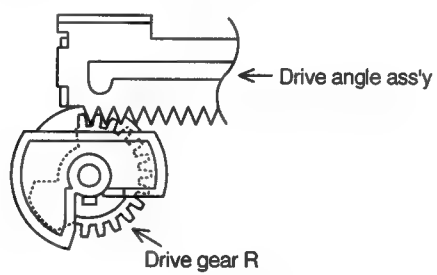


Figure 4-54.

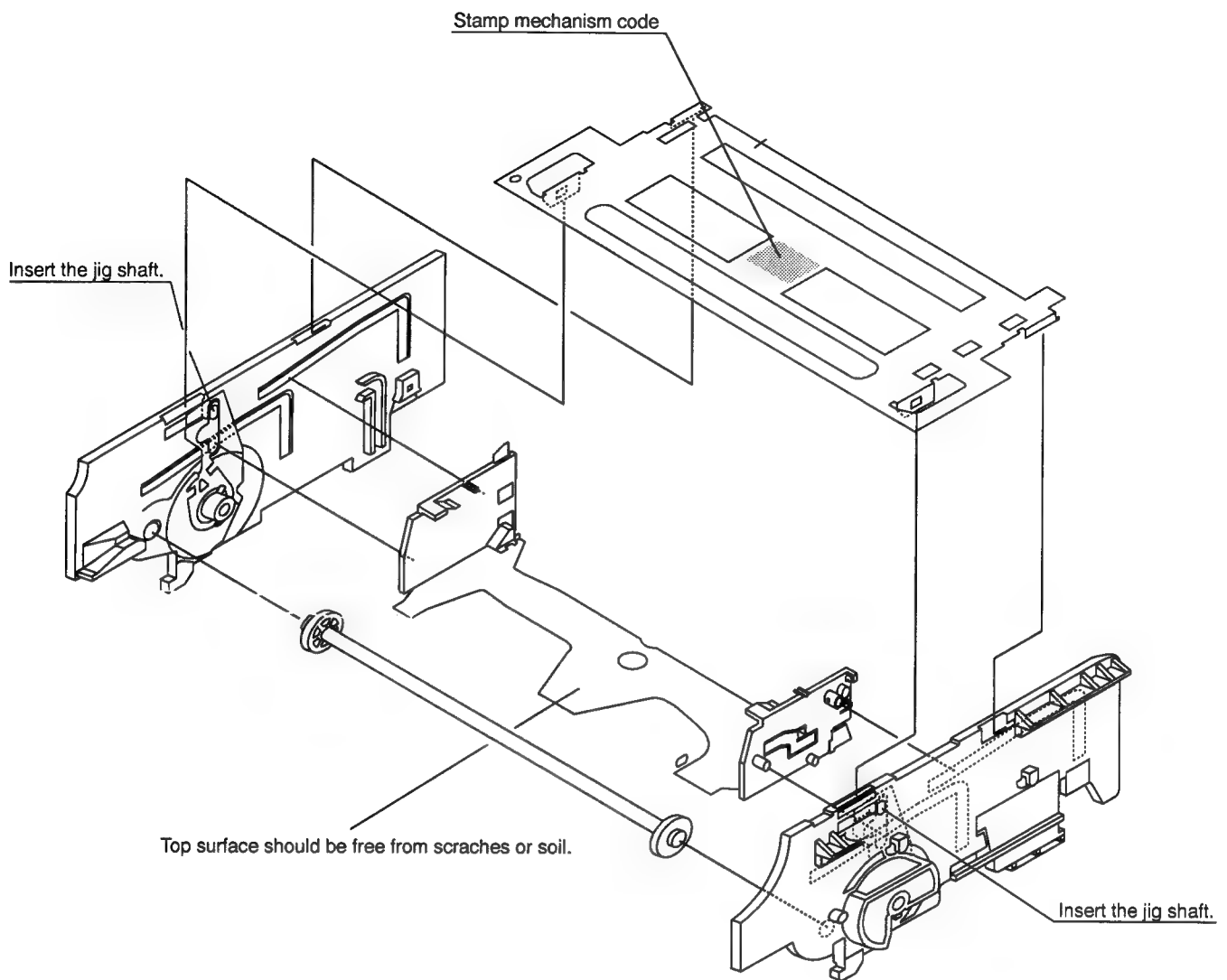


Figure 4-55.

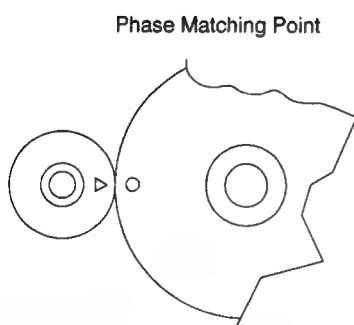


Figure 4-56.

such a case, the phase needs rematching. Align the drive gear's round hole with the synchro gear's triangular (  $\triangle$  ) symbol. Do this alignment for both the drive gears.

## ② Synchro Gear, Drive Gear L and Drive Gear R

### Note:

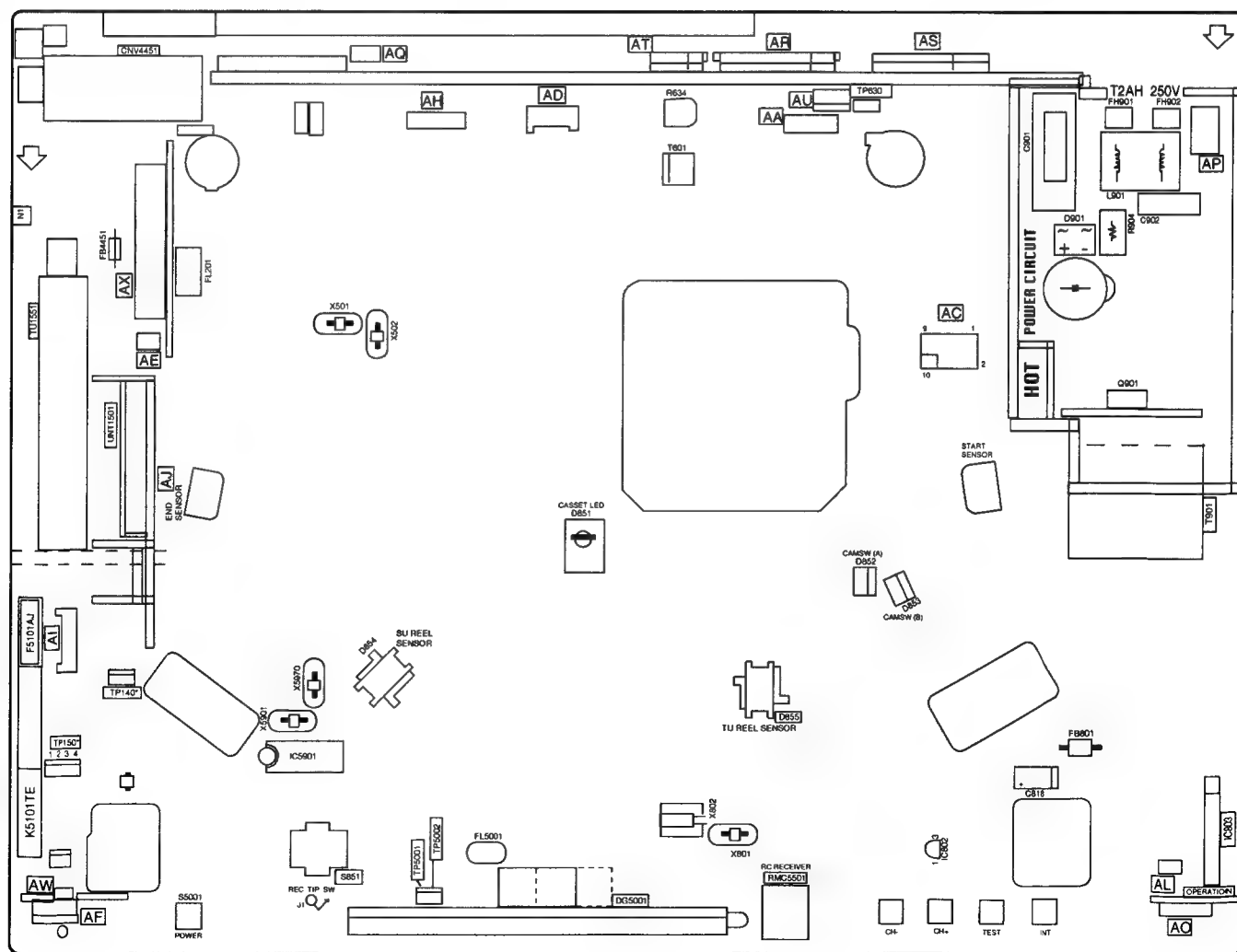
Do not over-turn both of the drive gears when the phase has been matched. These gears are partially toothless and might come out of mesh with the synchro gear. In

## 5. ELECTRICAL ADJUSTMENT

**Notes:**

- Before the adjustment:  
Electrical adjustments discussed here are often required after replacement of electronic components and mechanical parts such as video heads.  
Check that the mechanism and all electric components are in good working condition prior to the adjustments, otherwise adjustments can not be completed.
- Instruments required:
  - Colour TV monitor
  - Audio signal generator
  - DC voltmeter
  - Blank video cassette tape
  - Screwdriver for adjustment
  - Colour bar signal generator
  - Dual-trace oscilloscope
  - AC milli-voltmeter
  - Frequency counter
  - Alignment tape (VROCPSV)
  - Alignment tape (VROATSV)
  - Alignment tape (VROCBFFS)
- ※ Servicing precautions  
When the IC804 (E<sup>2</sup>PROM) has been replaced, make the following reprogramming. Depending on models, the IC804 (E<sup>2</sup>PROM) has been factory-adjusted for its memory function.  
It's therefore necessary to reprogram the memory function for the model in question.  
Note that the servo circuit requires readjustments for the head switching point, slow and still modes.

- **Location of controls and test points**



**Figure 5-1.**

## SERVO CIRCUIT ADJUSTMENT

### ADJUSTMENT OF HEAD SWITCHING POINT

Measuring instrument	Dual-trace oscilloscope Colour TV monitor
Mode	Playback
Cassette	Alignment tape (VROCPSV)
Test point	②pin of TP301 (H.SW.P.) to CH-1, VIDEO OUT jack to CH-2 (CH-1 trigger slope switch at (+), Internal trigger at CH-1 side.)
Specification	$6.5 \pm 0.5H$ (lines)

1. Remove the front panel and play the alignment tape. (VROCPSV)  
(Playback picture on the monitor screen.)
2. Press the test key.  
Be sure that all the fluorescent display tubes light up into the TEST mode.  
(See Note below)
3. Press the PLAY button.  
Be sure the "PLAY" appears in the fluorescent display tubes flashing (about 1Hz) into the auto PG adjustment operating.

**Note:**

When the manual PG adjustment, observe the waveform with an oscilloscope and make adjustment FF or REW button so that the specification.

4. Stop the "PLAY" appears in the flashing of fluorescent display tubes at adjusted.
5. Press the STOP button in the return to normal mode.
6. Make this checking of waveform on the oscilloscope screen be as shown in Figure 5-2. just after the head switching point have been adjusted.

**Note:**

- ① Set-up of TEST mode.  
When the adjustment of HEAD SWITCHING POINT, AUTO TRACKING function is invalid.
- ② When the cassette housing control ass'y is removed, set-up of mechanism operating mode.
  - 1) Replug the AC power cord it a few minutes later.
  - 2) Make a connection between TP5001 and TP5002, both located at the front side on the main PWB with a 22 ohm resistor, to center the tracking.
  - 3) AC power cord is plugged in.
  - 4) You can mechanism operating mode, Replug the AC power cord a few minutes later.

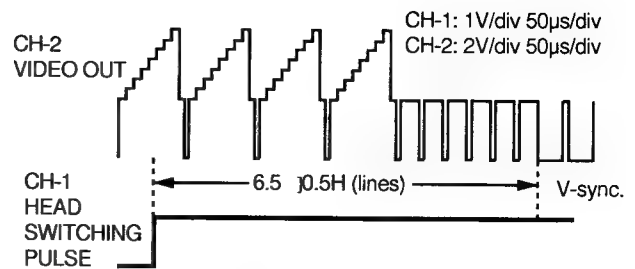


Figure 5-2.

### ADJUSTMENT OF SLOW TRACKING PRE-SET (2 HEAD MODELS)

Measuring instrument	Colour TV monitor
Mode	Playback
Cassette	Self-recorded tape (See Note below)
Control	Tracking control buttons (+) or (-)
Specification	Minimized noise on monitor screen

1. Have the unit to receive a good TV broadcast or feed a video signal to the VIDEO IN jack. (See note 2 below)
2. Record the signal on tape.
3. Rewind and play the tape where signal was recorded in above step.
4. Press the SLOW button on the remote control, and playback the recorded portion in the slow mode.
5. Press the test key.  
Be sure that all the fluorescent display tubes light up into the TEST mode.
6. Look at the monitor screen and adjust the (+) or (-) TRACKING buttons so that the there is noise disappears from the screen.
7. Press the STOP button to return to normal mode.
8. Play the tape a few seconds then press the SLOW button again and make sure there is on noise in the screen.

**Notes:**

- ① Self-recorded tape means a cassette whose program was recorded by the unit being adjusted.
- ② The TV program will not be recorded if RCA or 21 pin plugs are plugged in to the AUDIO/VIDEO input terminals.

## ADJUSTMENT OF SP/LP SLOW TRACKING PRESET (4 HEAD MODELS)

Measuring instrument	Colour TV monitor
Mode	Playback
Cassette	Self-recorded tape (SP/LP mode) (See Note below)
Control	Tracking control buttons (+) or (-)
Specification	Minimized noise on monitor screen

1. Have the unit to receive a good TV broadcast or feed a video signal to the VIDEO IN jack. (See note 2 below)
2. Set the tape speed in SP mode by using the remote control and record the signal on tape.
3. Rewind and play the tape where signal was recorded in above step.
4. Press the SLOW button on the remote control, and playback the recorded portion in the slow mode.
5. Press the test key.  
Be sure that all the fluorescent display tubes light up into the TEST mode.
6. Look at the monitor screen and adjust the (+) or (-) TRACKING buttons so that the there is noise disappears from the screen.
7. Press the STOP button to return to normal mode.
8. Play the tape a few seconds then press the SLOW button again and make sure there is no noise in the screen.  
(For the LP mode put adjustment at the same adjustment way as SP mode.)

### Notes:

- ① Self-recorded tape means a cassette whose program was recorded by the unit being adjusted.
- ② The TV program will not be recorded if RCA or 21pin plugs are plugged in to the AUDIO/VIDEO input terminals.

## ADJUSTMENT OF FV (False Vertical Sync) OF STILL PICTURE (2 HEAD MODELS)

1. Play a cassette which was recorded.

Measuring instrument	Colour TV monitor
Mode	Playback still
Cassette	Self-recorded tape (See Note below 2)
Control	Tracking control buttons (+) or (-)
Specification	No vertical jitter of picture

2. Press the PAUSE/STILL button to freeze the picture.
3. Look at the monitor screen and adjust (+) or (-) TRACKING buttons so that the vertical jitter of the picture to be minimized.
4. Play and freeze the self-recorded tape and make sure vertical jitter of the picture is not noticeable.

### Note:

- ① The FV goes back to the it's initial state when the unit is put into the system controller reset mode due to power failure, etc.  
In this case, preset the FV once again.
- ② Self-recorded tape is a cassette whose program was recorded by the unit being adjusted.

## ADJUSTMENT OF FV(False Vertical Sync) OF STILL PICTURE (4 HEAD MODELS)

Measuring instrument	Colour TV monitor
Mode	Playback still
Cassette	Self-recorded tape (SP mode) (See Note below ②)
Control	Tracking control buttons (+) or (-)
Specification	No vertical jitter of picture

1. Play a cassette which was recorded by the unit in SP mode.
2. Press the PAUSE/STILL button to freeze the picture.
3. Look at the monitor screen and adjust (+) or (-) TRACKING buttons so that the vertical jitter of the picture to be minimized.
4. Play and freeze the self-recorded tape in SP mode and make sure vertical jitter of the picture is not noticeable.  
(For the LP mode put adjustment at the same adjustment way as SP mode.)

### Note:

- ① The FV goes back to the it's initial state when the unit is put into the system controller reset mode due to power failure, etc.  
In this case, preset the FV once again.
- ② Self-recorded tape is a cassette whose program was recorded by the unit being adjusted.

## Y/C CIRCUIT ADJUSTMENT

### CHECKING OF VIDEO E-E LEVEL

Measuring instrument	Oscilloscope
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p)
Test point	VIDEO OUT jack
Specification	$1.0 \pm 0.1\text{Vp-p}$

1. Connect a 75 ohm terminating resistor to the VIDEO OUT jack and connect an oscilloscope across this terminating resistor.  
(See Note below.)
2. Feed a colour bar signal to the VIDEO IN jack.
3. Make sure that the E-E signal amplitude is 1.0Vp-p as shown in Figure 5-3.

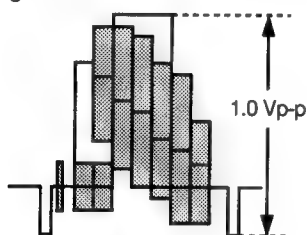


Figure 5-3.

#### Notes:

If the 75 ohm terminating resistor is missing, the signal amplitude will be doubled.

### CHECKING OF WHITE CLIP LEVEL

Measuring instrument	Oscilloscope
Mode	E-E or Record
Input signal	EIA colour bar (1.0Vp-p)
Test point	Pin(48) of IC401, GND
Specification	$190 \pm 5\%$ (See note below)

1. Connect a oscilloscope to pin(48) of IC401 and GND.
2. Feed the colour bar signal to the VIDEO IN jack and set the unit in E-E or recording mode.
3. Make sure that the overshoot of the video signal is clipped at 190% as shown in Figure 5-4.

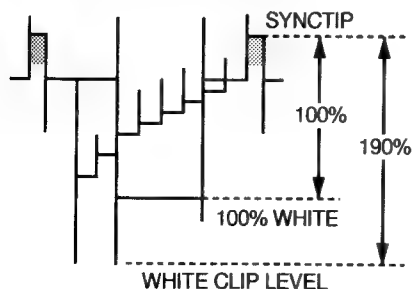


Figure 5-4.

#### Note:

From sync tip to white peak, the level is 100%.  
The white clip level is 90% above the white level.

### CHECKING OF RECORD LEVEL

Measuring instrument	Dual-trace oscilloscope
Mode	Record mode
Input signal	EIA colour bar (1.0Vp-p)
Test point	Chroma (Red) R515 terminal lead at L509 side (Sig.) ~ GND Sync tip R226 terminal lead at L210 side (Sig.) ~ GND
Specification	Chroma (Red): 205~290mVp-p Sync tip: 360~440mVp-p

1. Feed the colour bar signal to the VIDEO IN jack and set the unit in recording mode.
2. Connect a dual-trace oscilloscope to each test point shown in table.
3. Make sure so that the amplitude of the chrome (Red) portion and the sync tip portion are specified as shown in Figure 5-5

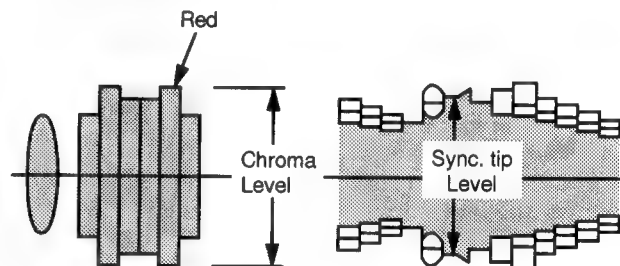


Figure 5-5 (a).

Figure 5-5 (b).



## CHECKING OF PLAYBACK LEVEL

Measuring instrument	Oscilloscope
Mode	Record/Playback
Input signal	EIA colour bar (1.0Vp-p)
Test point	VIDEO OUT jack
Specification	$1.0 \pm 0.1\text{Vp-p}$

1. Be sure that E-E level has been correctly specified.
2. Connect a 75 ohm terminating resistor to the VIDEO OUT jack and connect an oscilloscope across this terminating resistor.  
(See Note below.)
3. Feed a colour bar signal to the VIDEO IN jack and set the unit in recording mode.
4. Play the colour bar portion of the recorded tape.
5. Make sure that the output signal amplitude is 1.0Vp-p as shown in Figure 5-6.

**Note:**

If the 75 ohm terminating resistor is missing, the signal amplitude will be doubled.



Figure 5-6.

## AUDIO CIRCUIT

### CHECKING OF E-E LEVEL

Measuring instrument	AC milli-voltmeter
Mode	E-E/Record
Input signal	1kHz, -8.0dBs (at RCA type jack) 1kHz, -3.8dBs (at 21pin type jack)
Test point	AUDIO OUT jack
Specification	-8.0 ± 2dBs (at RCA type jack) -3.8 ± 2dBs (at 21pin type jack)

1. Connect an oscilloscope to the AUDIO OUT jack.
2. Feed the audio signal shown in table to the AUDIO IN jack.
3. Put the unit in E-E or recording mode.
4. Make sure that the output level is value shown in table.

### CHECKING OF AUDIO PLAYBACK LEVEL

Measuring instrument	AC milli-voltmeter
Mode	Playback
Input signal	Alignment tape.(VROCPSV) (1kHz level control signal.)
Test point	AUDIO OUT jack
Specification	-9 <sup>+2dB</sup> <sub>-1dB</sub>

1. Playback the Alignment tape. (VROCPSV 1kHz level audio signal)
2. Connect an AC milli-voltmeter to the AUDIO OUT jack.
3. Make sure that the output level is value shown in table.

### CHECKING OF AUDIO RECORD LEVEL

Measuring instrument	AC milli-voltmeter
Mode	Record/playback
Input signal	1kHz, -8.0dBs (at RCA type jack) 1kHz, -3.8dBs (at 21pin type jack)
Test point	AUDIO OUT jack
Specification	-8.0 ± 3dBs (at RCA type jack) -3.8 ± 3dBs (at 21pin type jack)

1. Connect an oscilloscope to the AUDIO OUT jack.
2. Feed the audio signal shown in table to the AUDIO IN jack.
3. Make the self-recording and playback of the signal.
4. Make sure that the output level is value shown in table. If it's out of specified value, verify the bias current (CHECKING OF AUDIO BIAS CURRENT below).

### CHECKING OF AUDIO BIAS CURRENT

Measuring instrument	AC milli-voltmeter
Mode	Record
Input signal	Not required
Test point	TP601 (+) ~ TP602 (-)
Specification	2.5 ± 0.1mVrms

1. Connect an AC milli-voltmeter to TP601 (+) and TP602 (-).  
(Use TP602 for ground lead.)
2. Put the unit in recording mode.
3. Make sure that the AC milli-voltmeter reads 2.5 ± 0.1mVrms.

### CHECKING OF ERASE VOLTAGE AND OSCILLATION FREQUENCY

Measuring instrument	Oscilloscope
Mode	Record
Test point	Full erase head
Control	T601
Specification	70 ± 5kHz, 40Vp-p or greater

1. Put the unit in recording mode.
2. Connect an oscilloscope across the full erase head.
3. Make sure the erase voltage across the full erase head is approx. 40Vp-p or more and frequency is 70 ± 5kHz.

## RF CIRCUIT

### ADJUSTMENT OF RF AGC CIRCUIT (For G/S/H version)

Measuring instrument	DC voltmeter and VHF signal generator
Mode	RF signal at E12-CH (by VHF signal generator) (EBU colour bar signal at 87.5% modulated.)
Test point	TP1552 (Sig.) TP1554 (GND)
Control	VR001 AGC control
Specification	$4.5 \pm 0.1V$

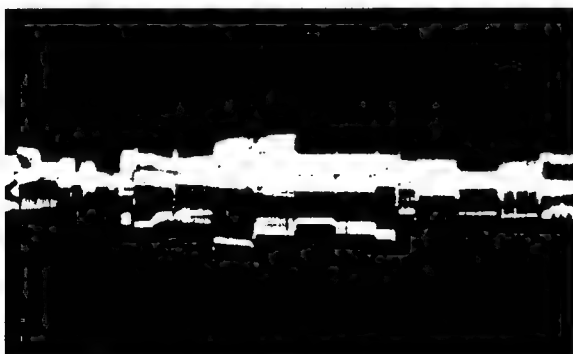
1. Receive the E12 channel signal(colour bar signal at 87.5% modulated.) at Input field strength: 70dB $\mu$ V of antenna terminal.
2. Connect a DC voltmeter to test points shown in table.
3. Adjust VR001 (AGC control) in the IF pack so that the voltage be specified.

### SORT TV ADJUSTMENT PROCEDURE

1. Tune the VCR Pr1 to the test signal. (Preferably a fixed pattern).
2. Tune the TV Pr1 to the test signal.
3. Tune the TV Pr2 to any other signal.
4. Set TV back to Pr1.
5. Select E1 on the VCR.
6. Connect an oscilloscope probe to test point TP5802.
7. Adjust R5809 until the signal level is at a minimum.



8. Select TV Pr2. Check that the signal level is greater than in Step 7 above.



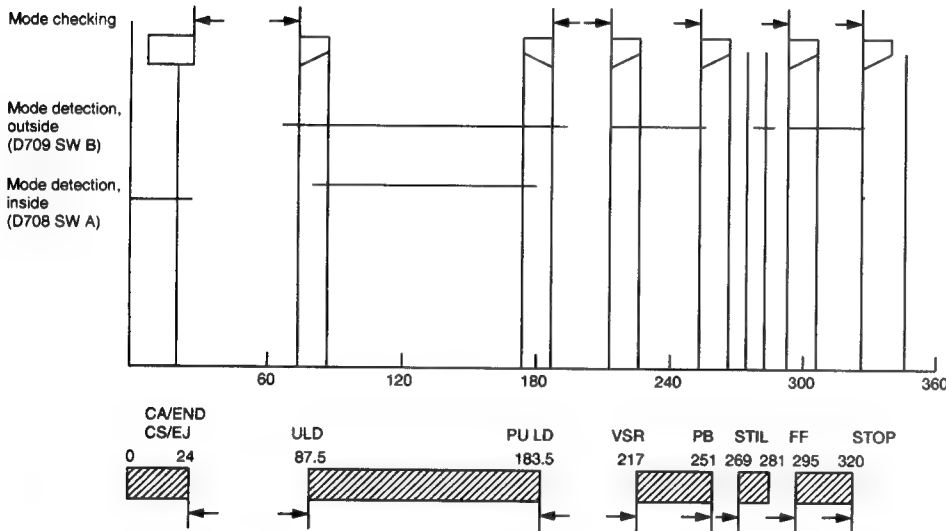
Please note: The test signal on TV Pr1 and the normal signal on TV Pr2 **MUST** be completely different.

6. MECHANISM OPERATION FLOWCHART AND TROUBLESHOOTING GUIDE

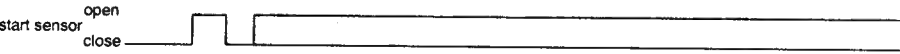
MECHANISM OPERATION FLOWCHART

\* This flowchart describes the outline of the mechanism's operation, but does not give its details.

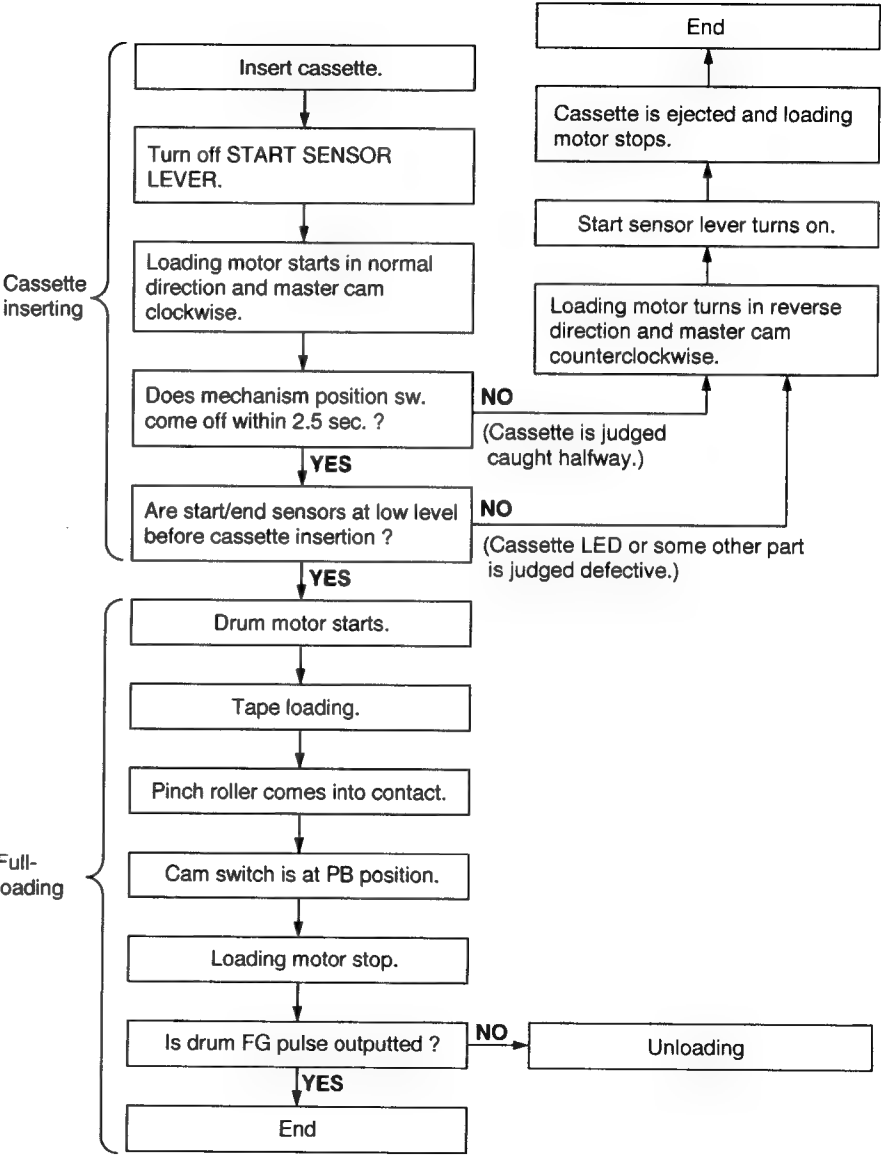
Cam movement chart



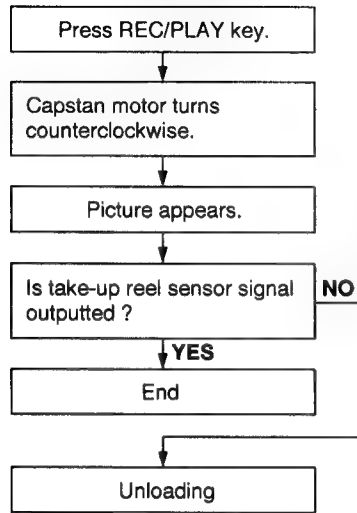
	CS/EJ						ULD		PU LD		VSR		PB	STL	FF	STOP	
Mode detection, outside	0	0	0	0	0	1	1		1	1	0	1	1	0	1	1	0
Mode detection, inside	1	1	0	0	0	0	1		1	0	0	0	0	0	0	0	0
S sensor	1	1	0	1	1 or 0												



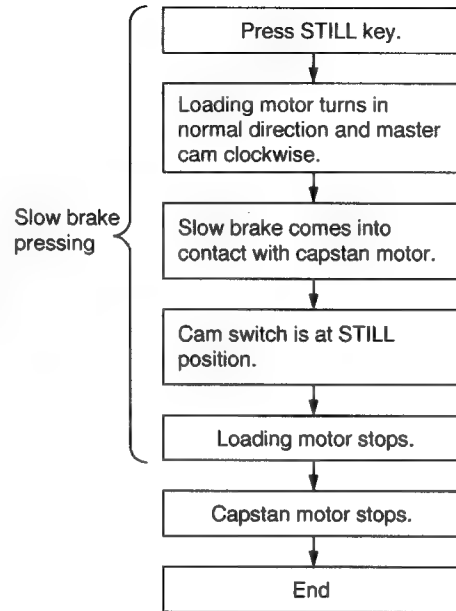
CASSETTE INSERTION / STOP



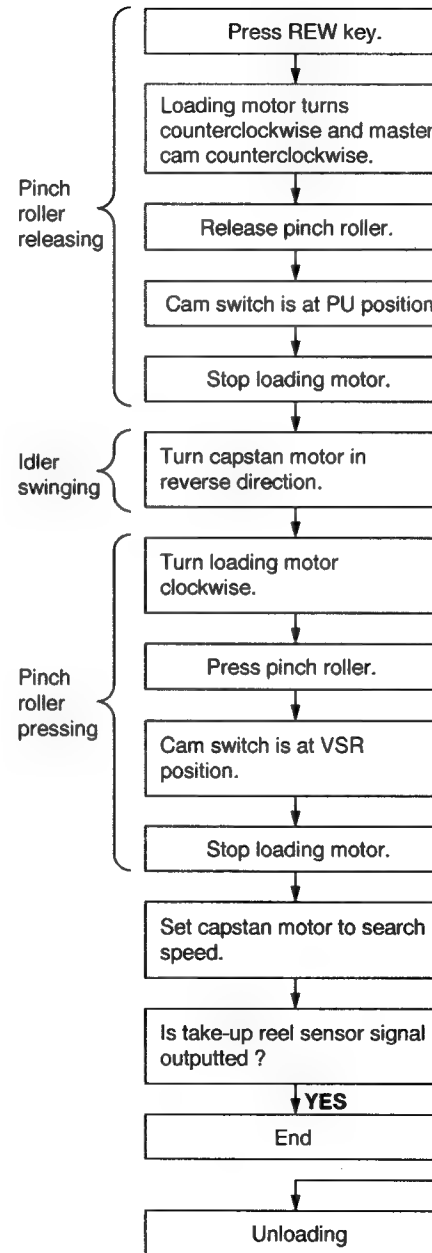
STOP / REC/PLAY



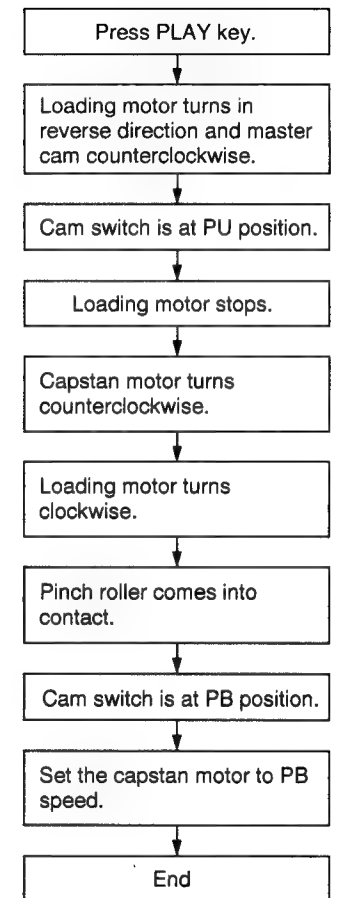
PLAY / STILL



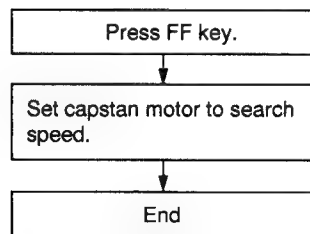
PLAY / VSR



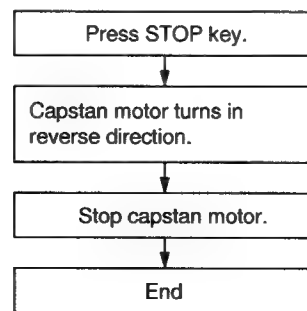
VSR / PLAY

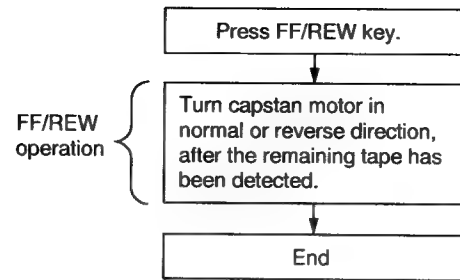
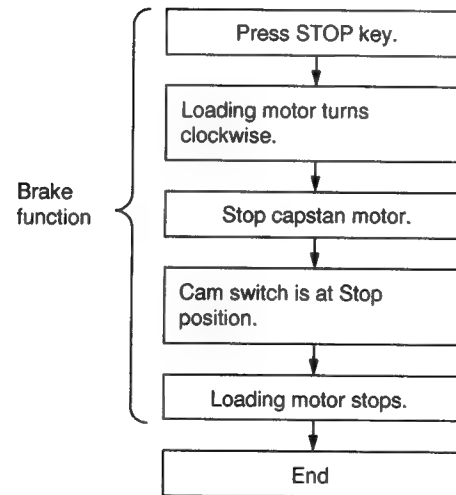
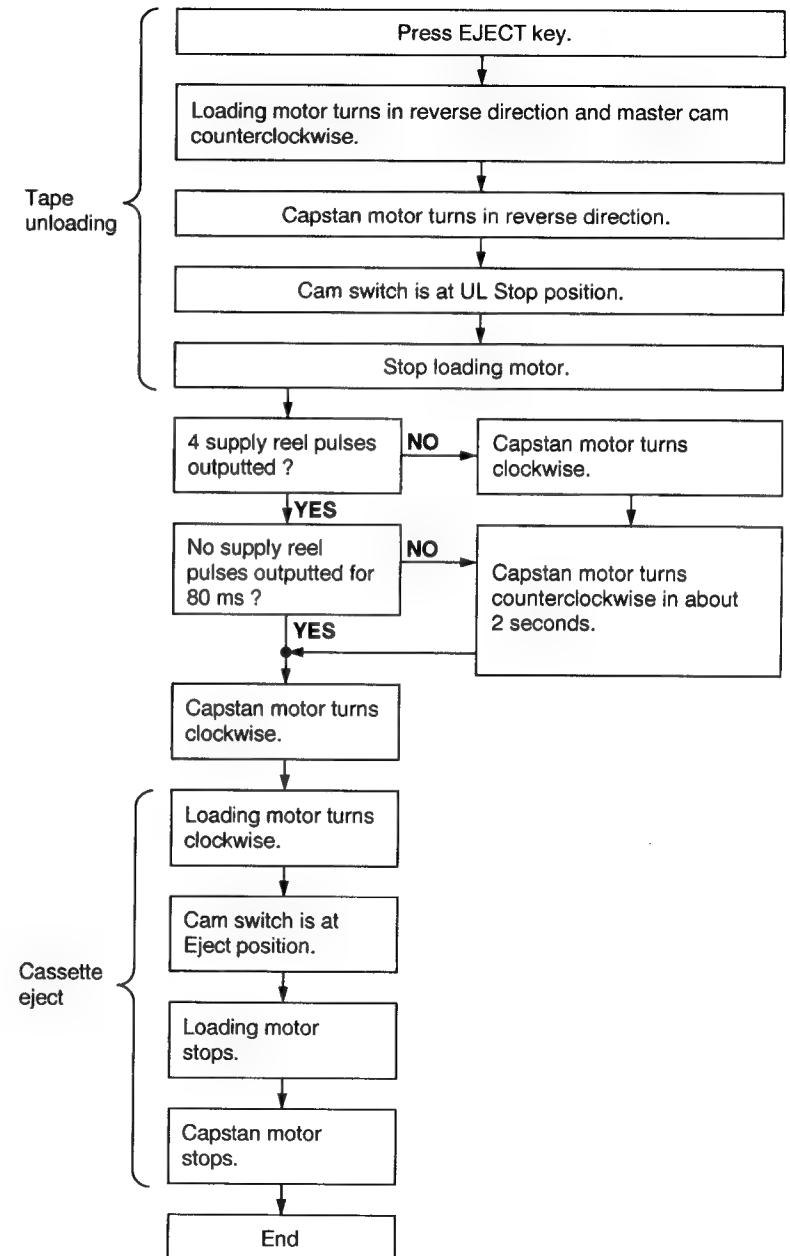


PLAY / VSF



REC/PLAY / STOP

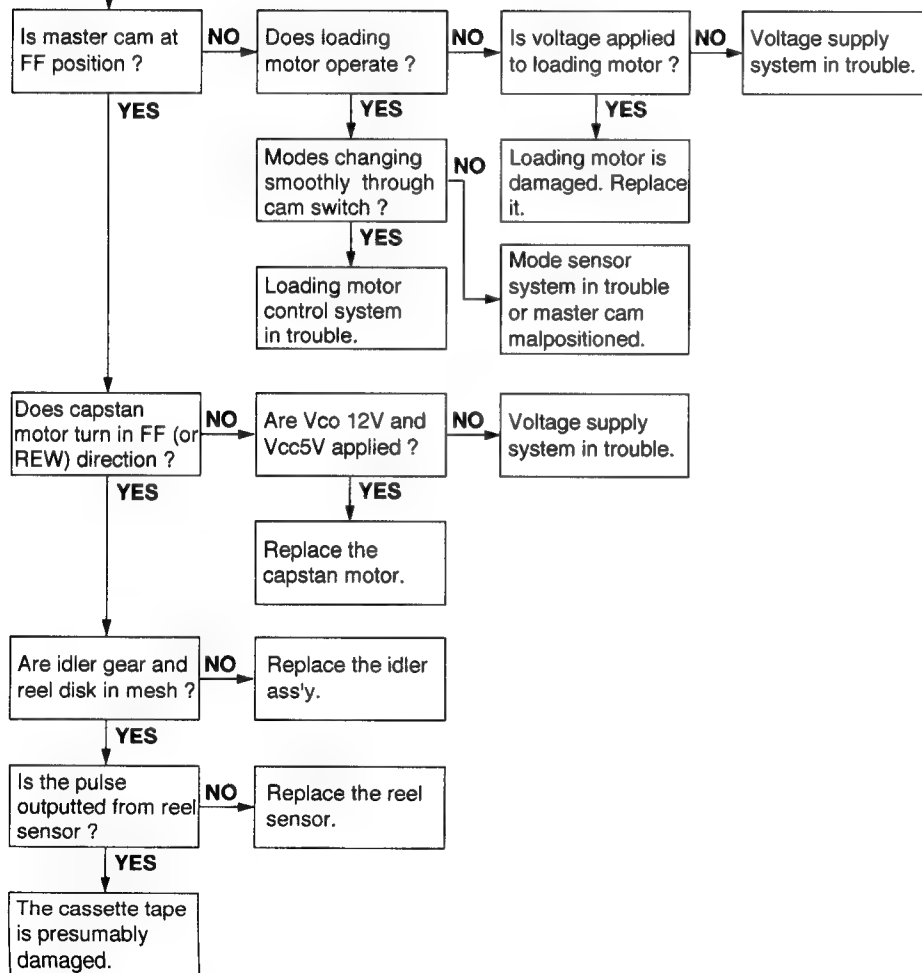


STOP / FF/REWFF/REW / STOPSTOP / CASSETTE EJECT

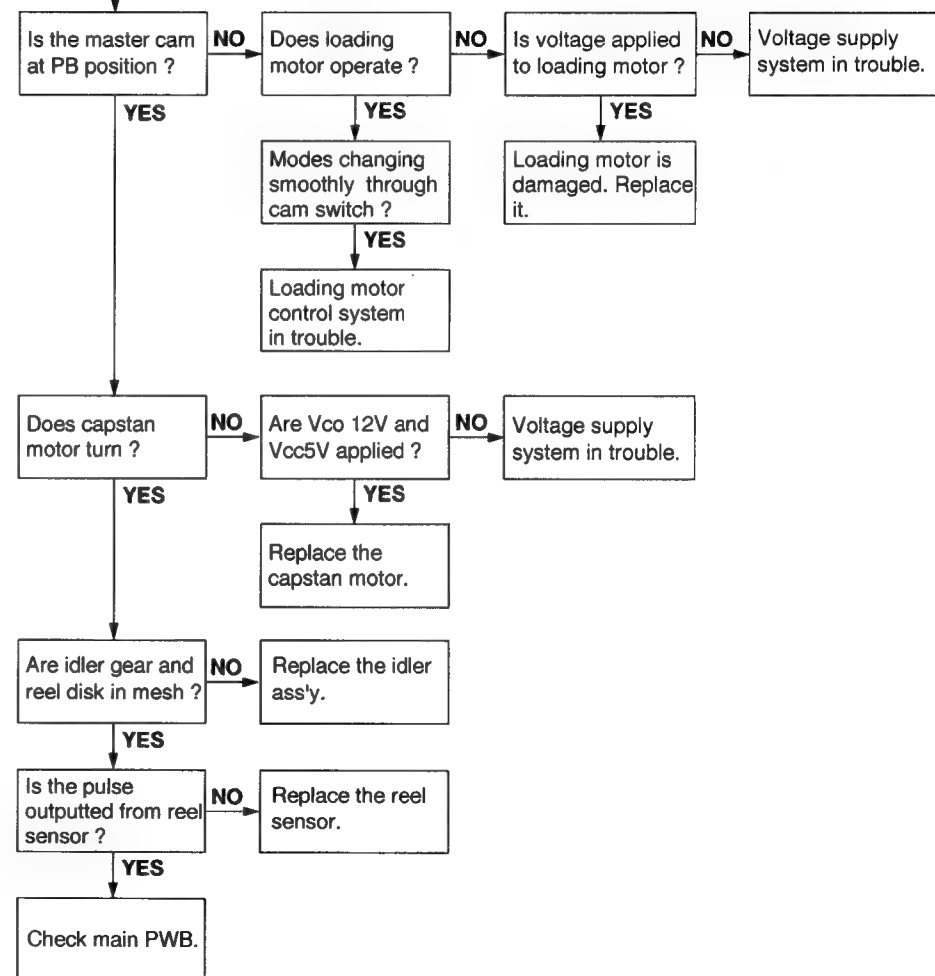
## MECHANISM TROUBLESHOOTING

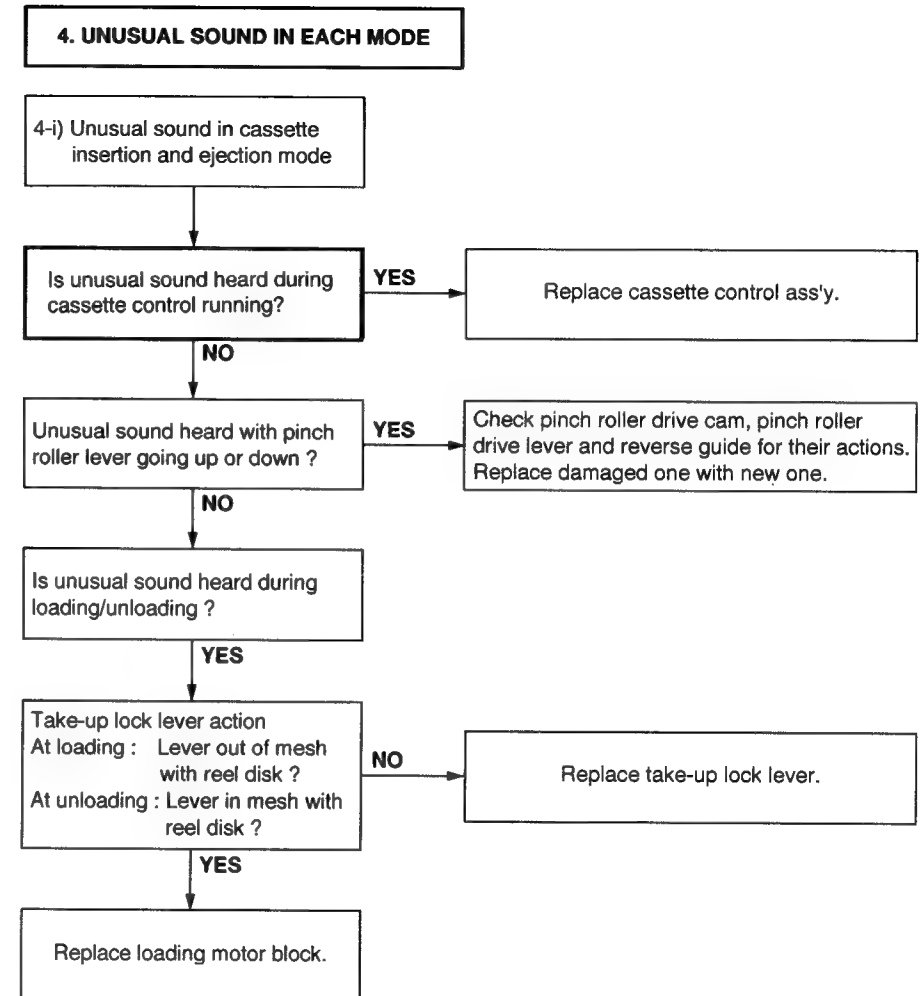
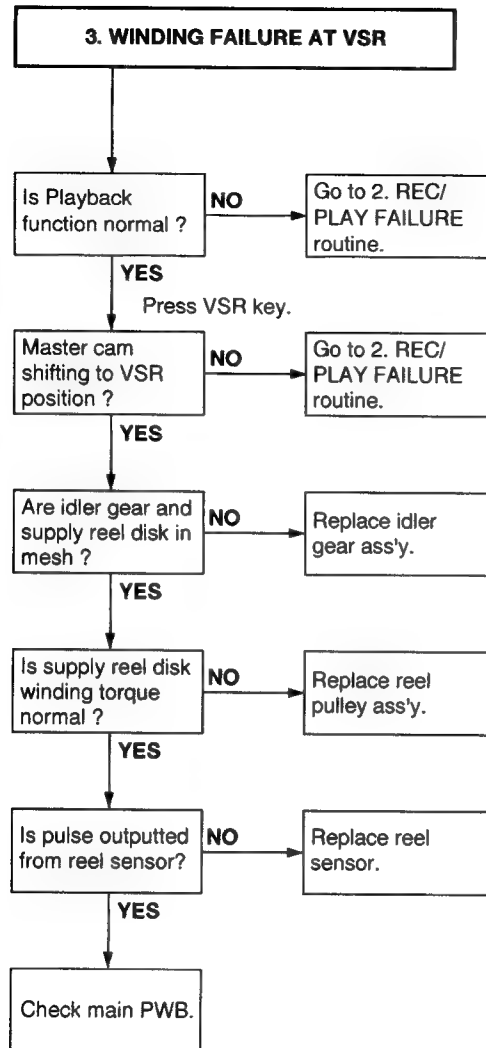
### 1. FF/REW FAILURE (NO TAPE WINDING)

Press FF key.

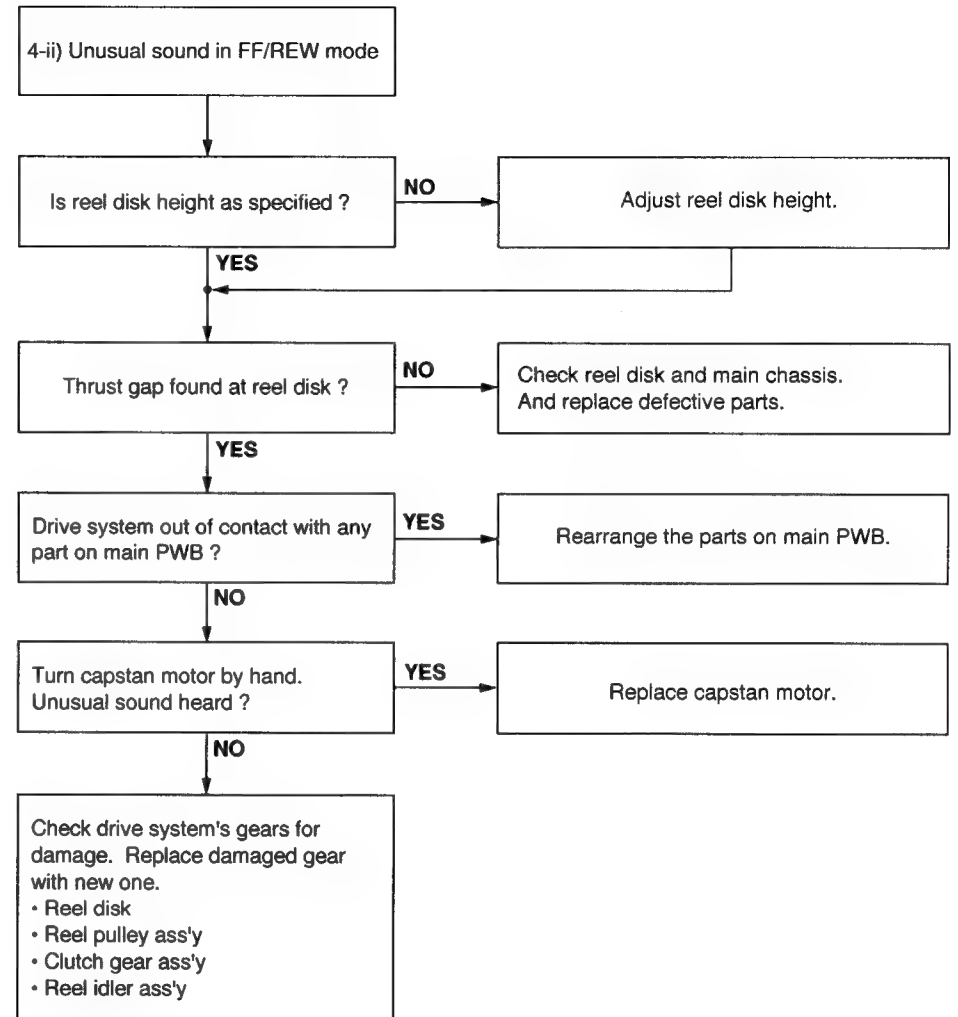


### 2. REC/PLAY FAILURE (MODE RELEASE)



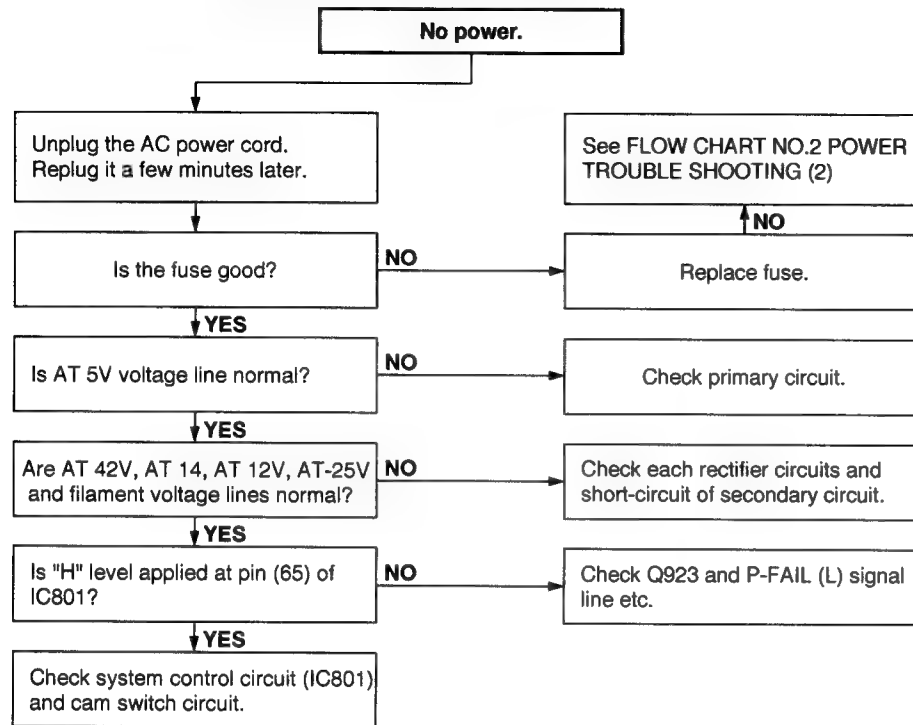




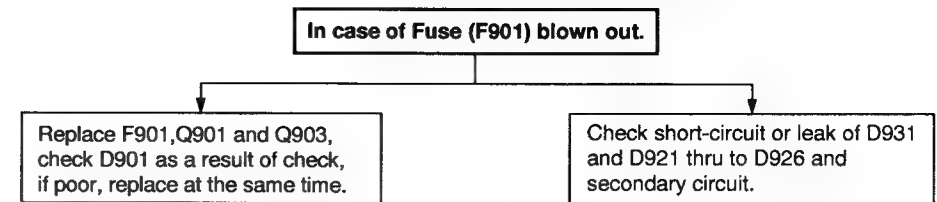


## 7. TROUBLESHOOTING

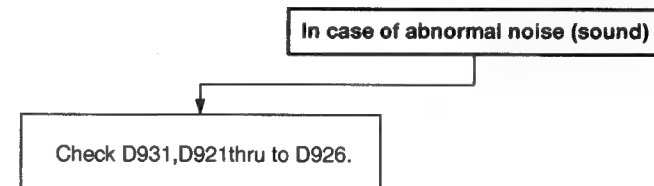
FLOW CHART NO.1 POWER TROUBLESHOOTING (1)



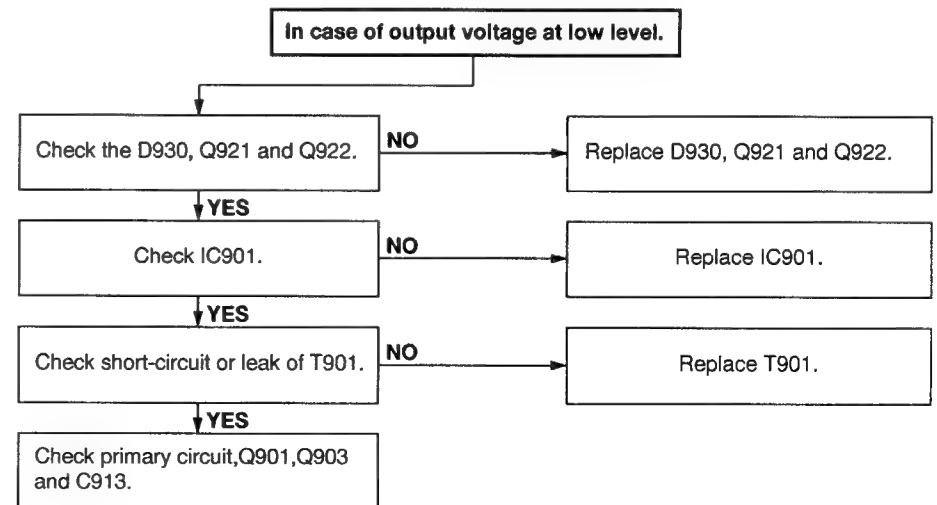
FLOW CHART NO.2 POWER TROUBLESHOOTING (2)



FLOW CHART NO.3 POWER TROUBLESHOOTING (3)

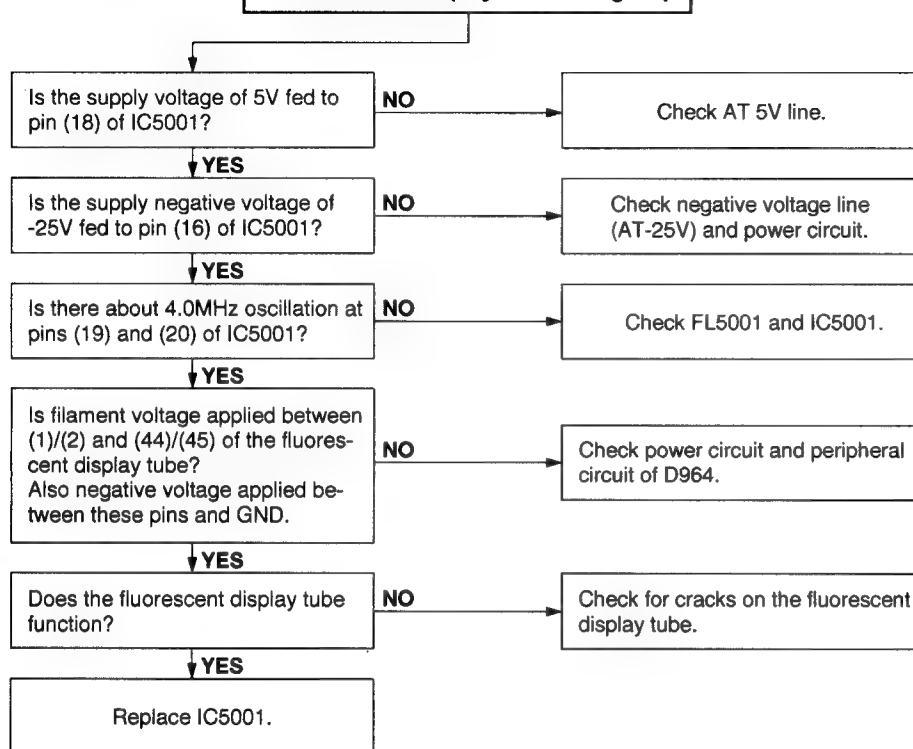


FLOW CHART NO.4 POWER TROUBLESHOOTING (4)



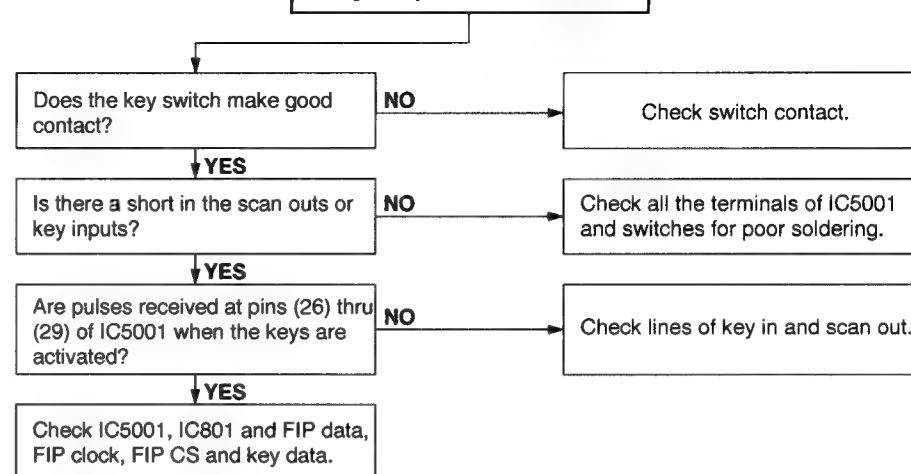
### FLOW CHART NO.5 TIMER (1) TROUBLESHOOTING

The fluorescent display tube fails light up.



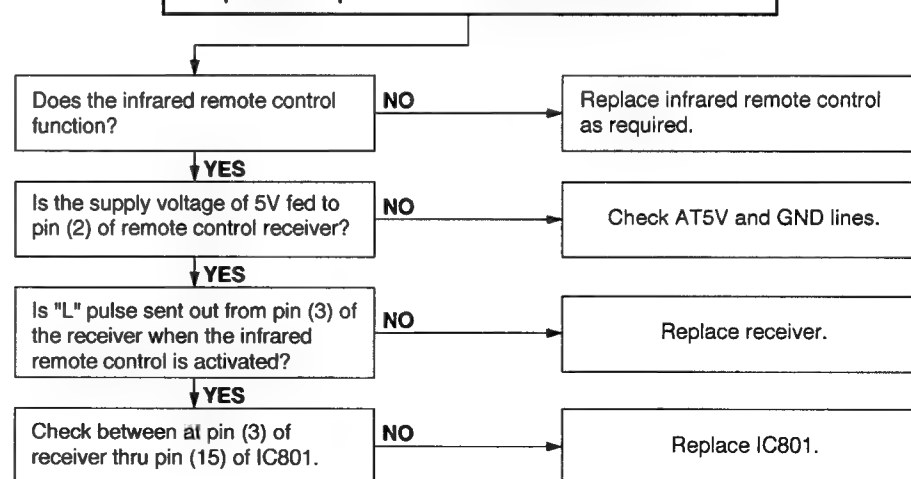
### FLOW CHART NO.6 TIMER (2) TROUBLESHOOTING

Key-in input is not received.

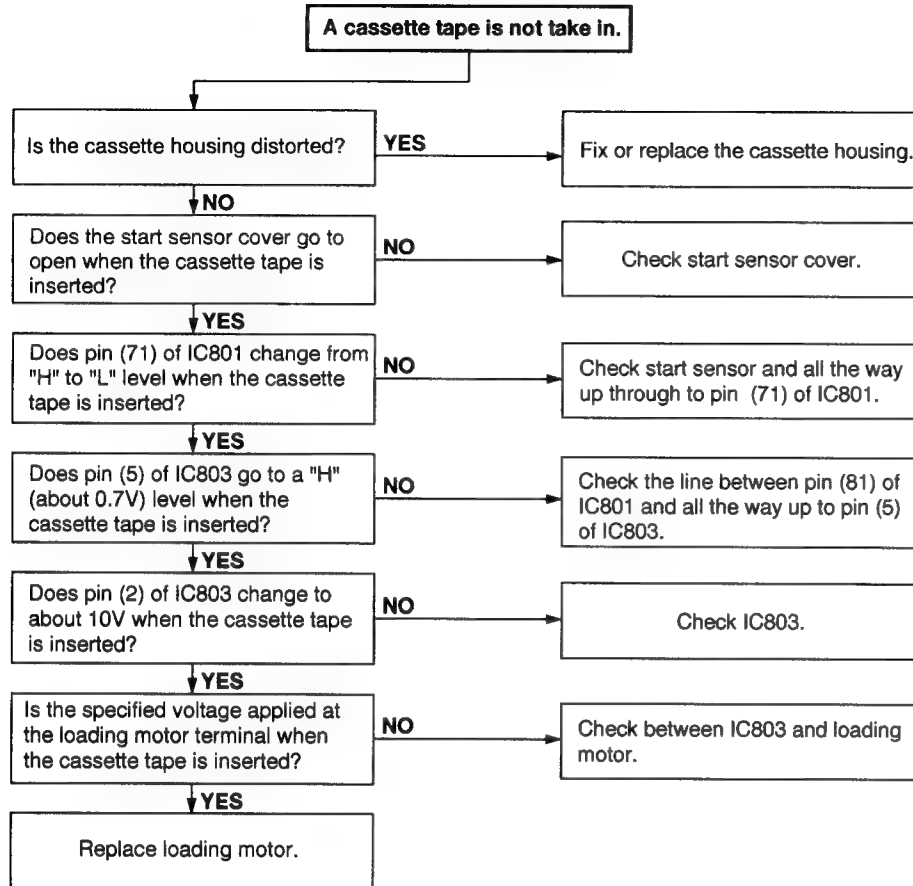


### FLOW CHART NO.7 INFRARED R/C TROUBLESHOOTING

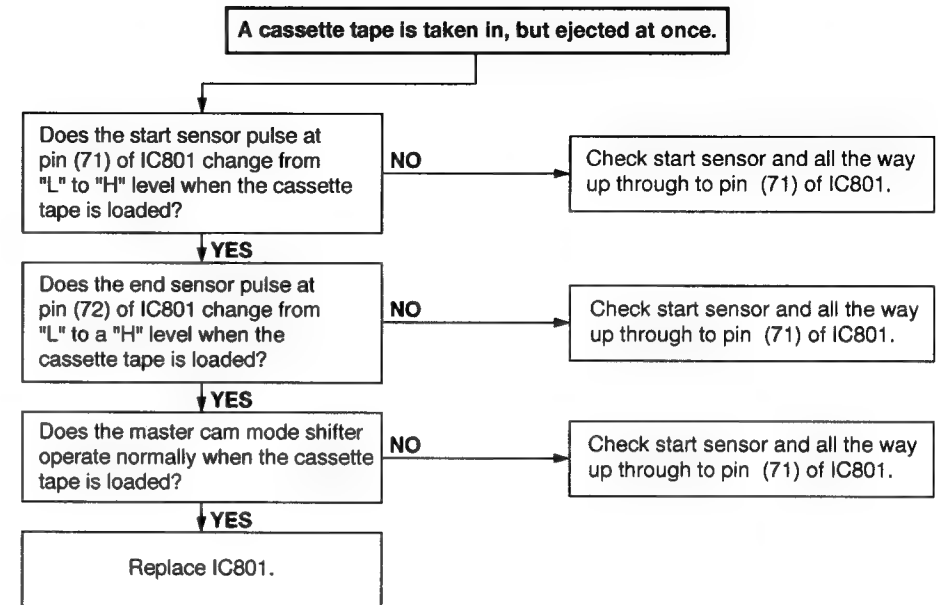
No operation is possible from the infrared remote control.



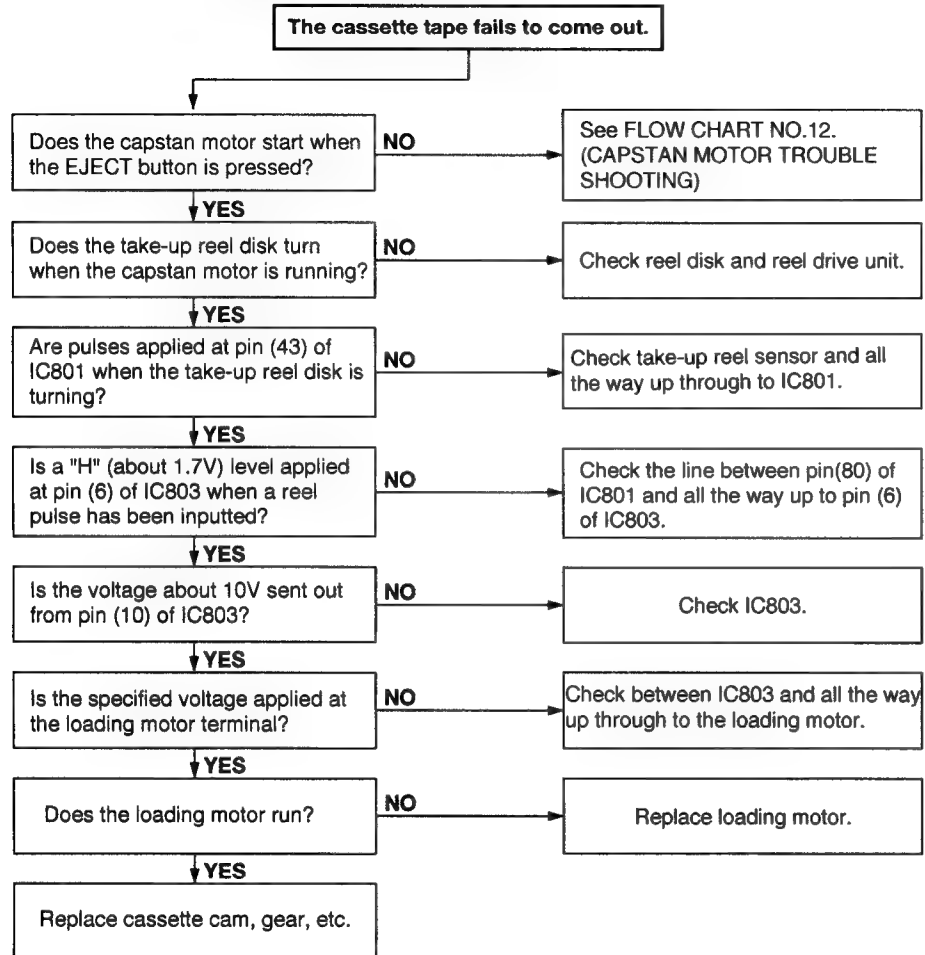
FLOW CHART NO.8 CASSETTE CONTROL TROUBLESHOOTING(1)



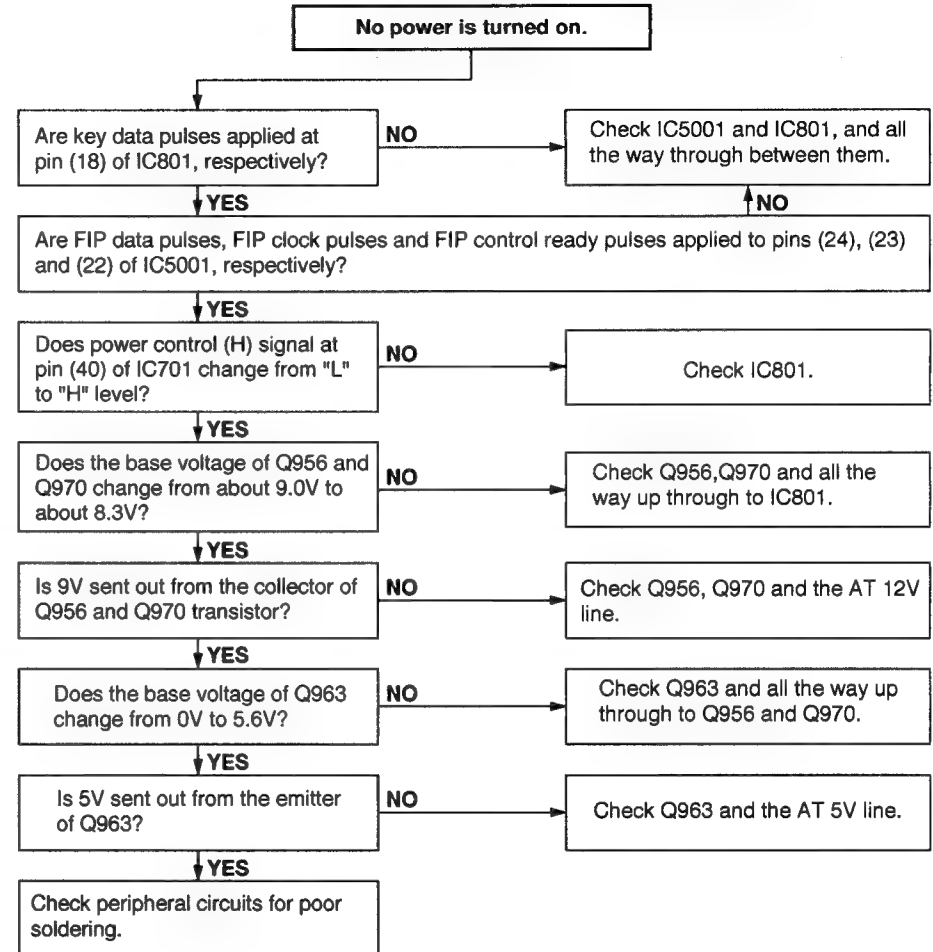
FLOW CHART NO.9 CASSETTE CONTROL TROUBLESHOOTING (2)



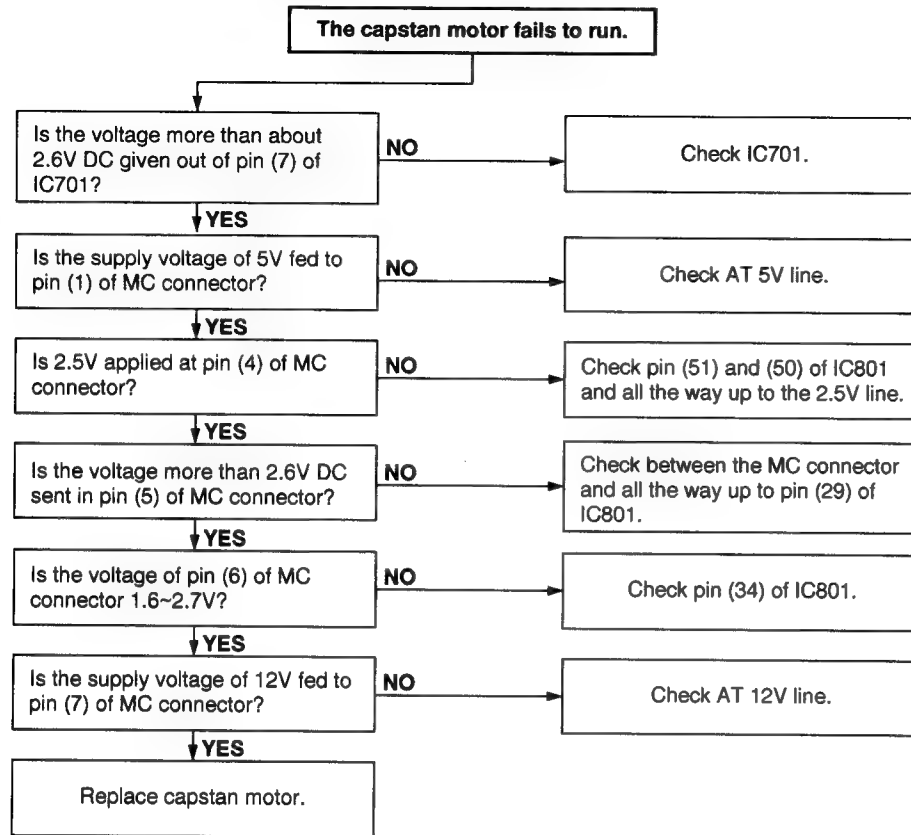
FLOW CHART NO.10 LOADING MOTOR AND EJECT TROUBLESHOOTING



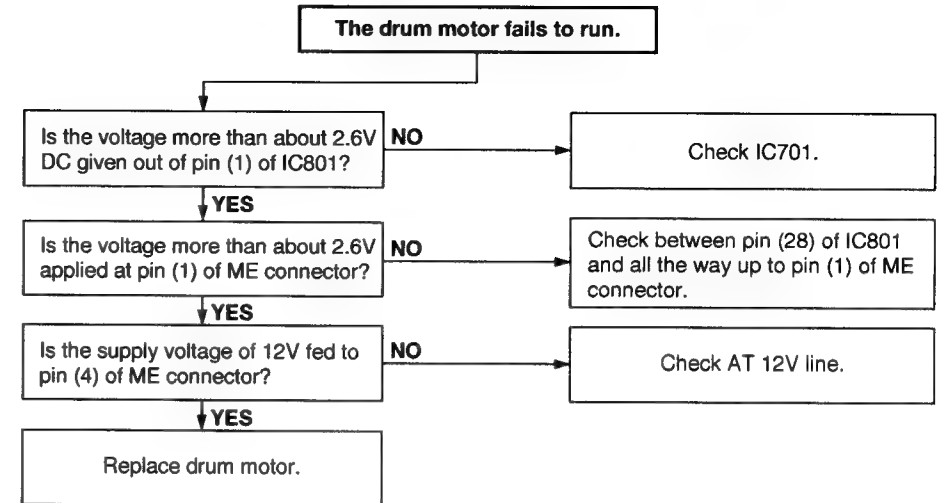
FLOW CHART NO.11 SYSTEM CONTROL TROUBLESHOOTING



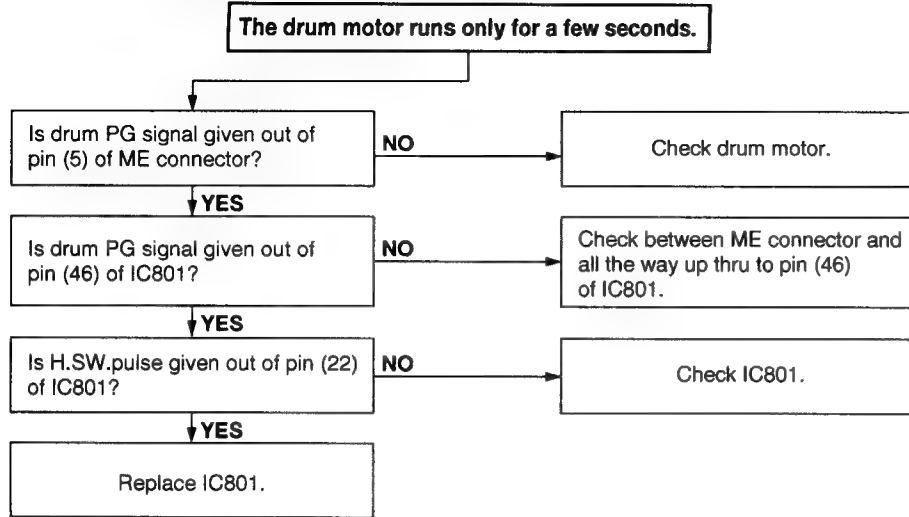
# FLOW CHART NO.12 CAPSTAN MOTOR TROUBLESHOOTING



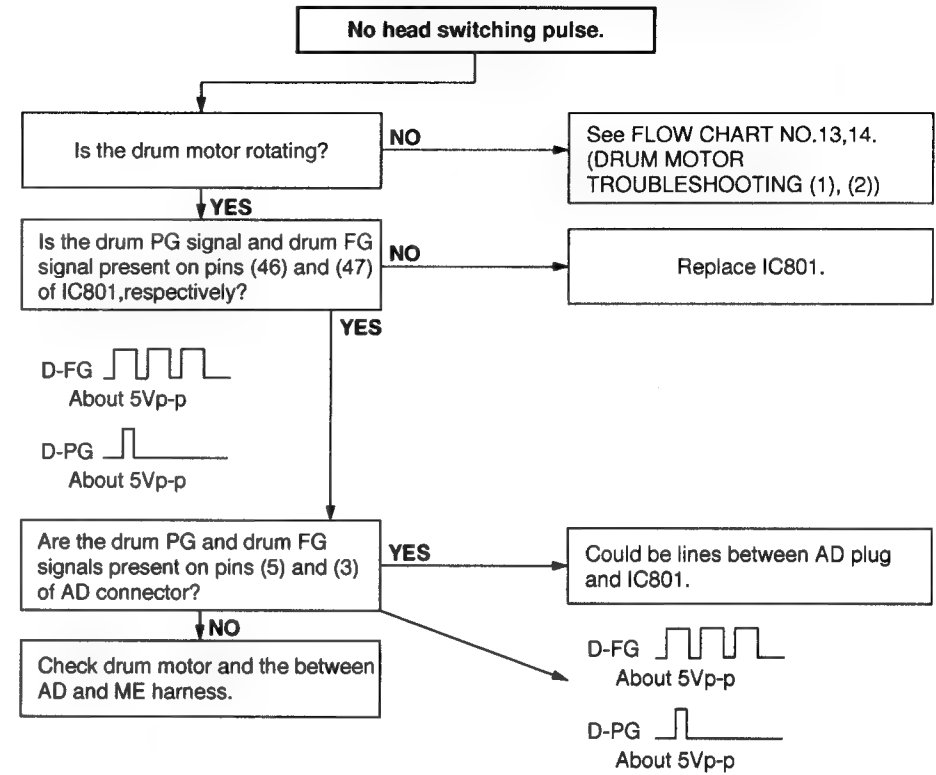
# FLOW CHART NO.13 DRUM MOTOR TROUBLESHOOTING (1)



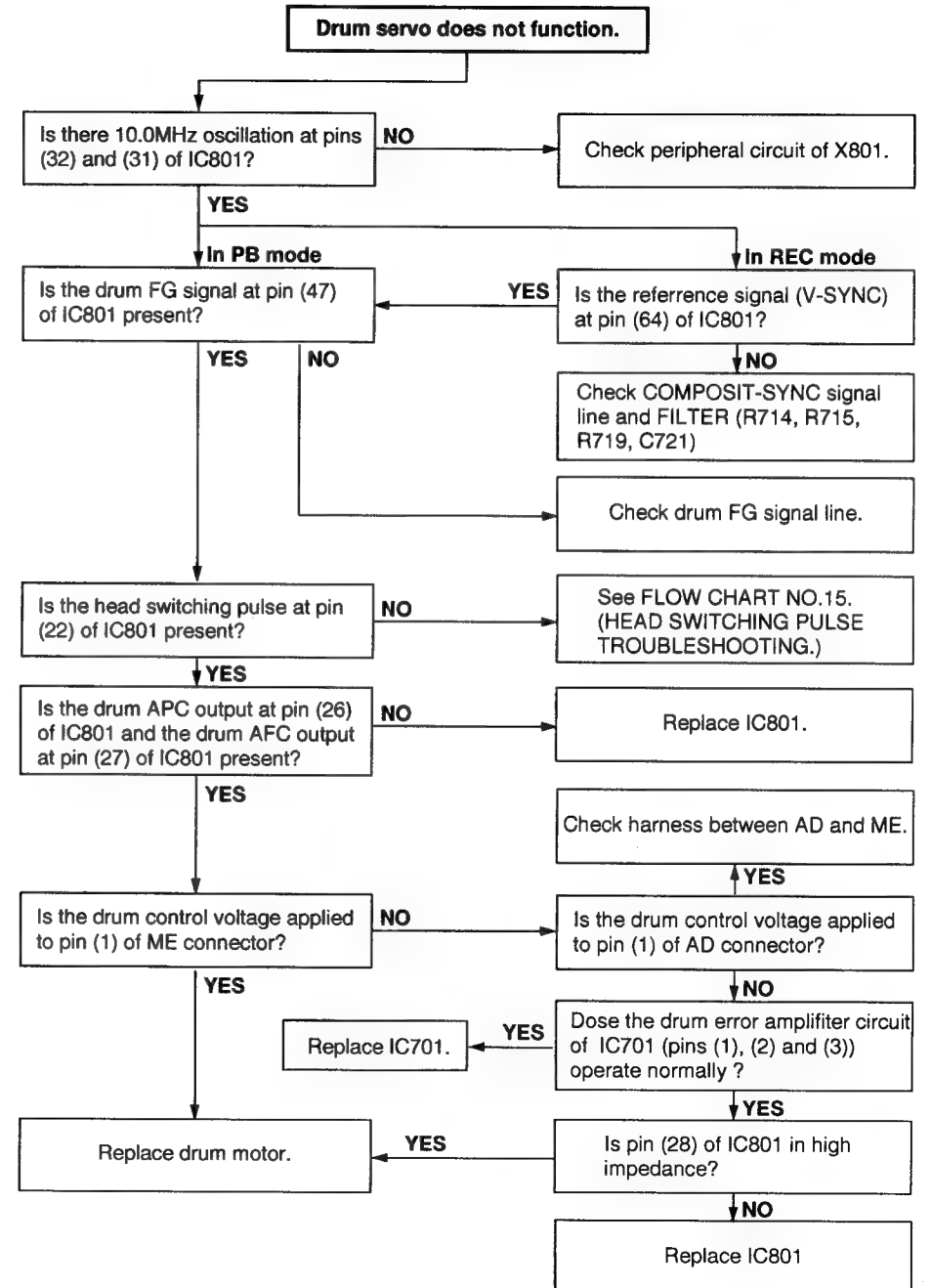
# FLOW CHART NO.14 DRUM MOTOR TROUBLESHOOTING (2)



# FLOW CHART NO.15 HEAD SWITCHING PULSE TROUBLESHOOTING.

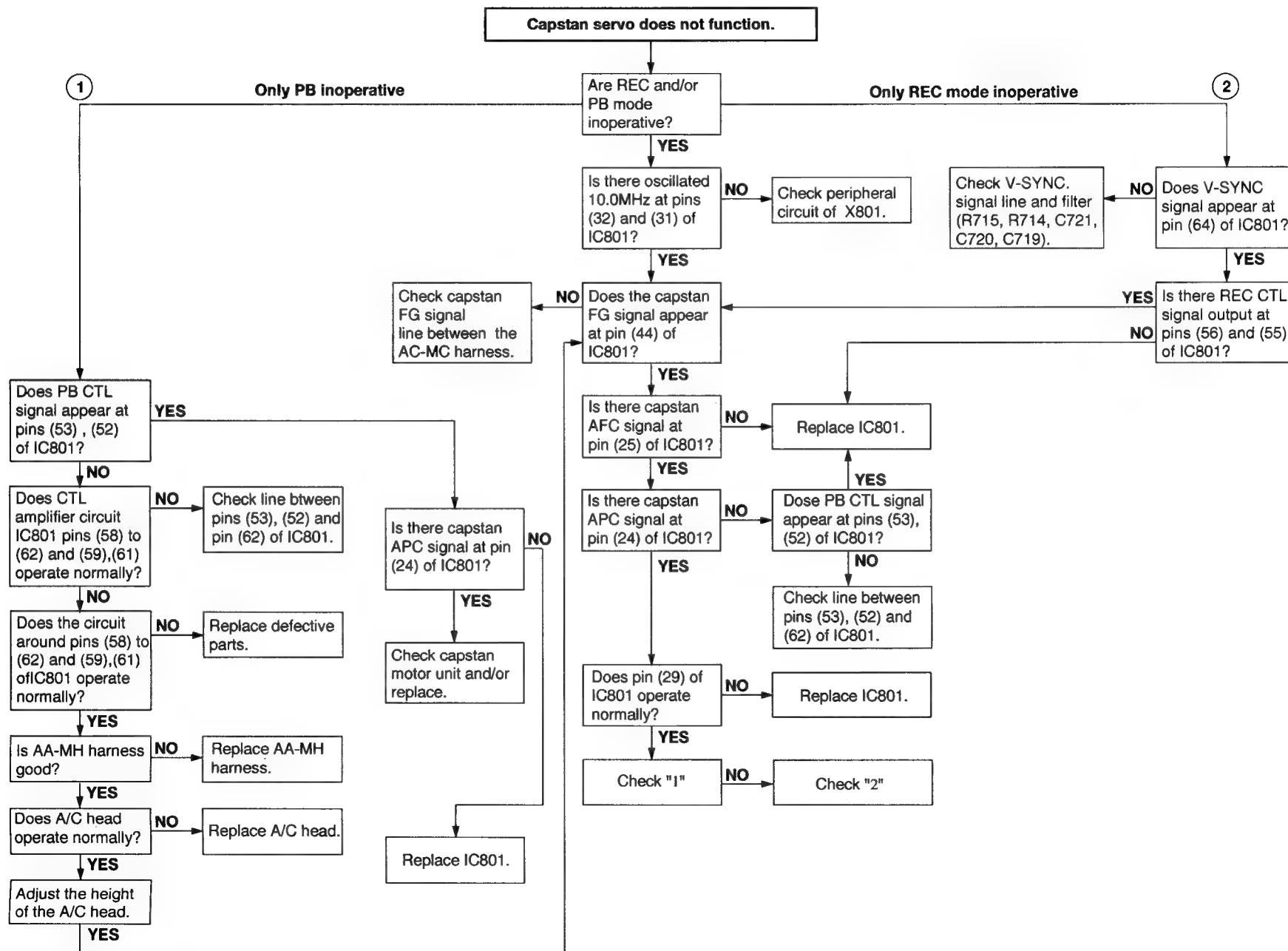


# FLOW CHART NO.16 DRUM SERVO TROUBLESHOOTING

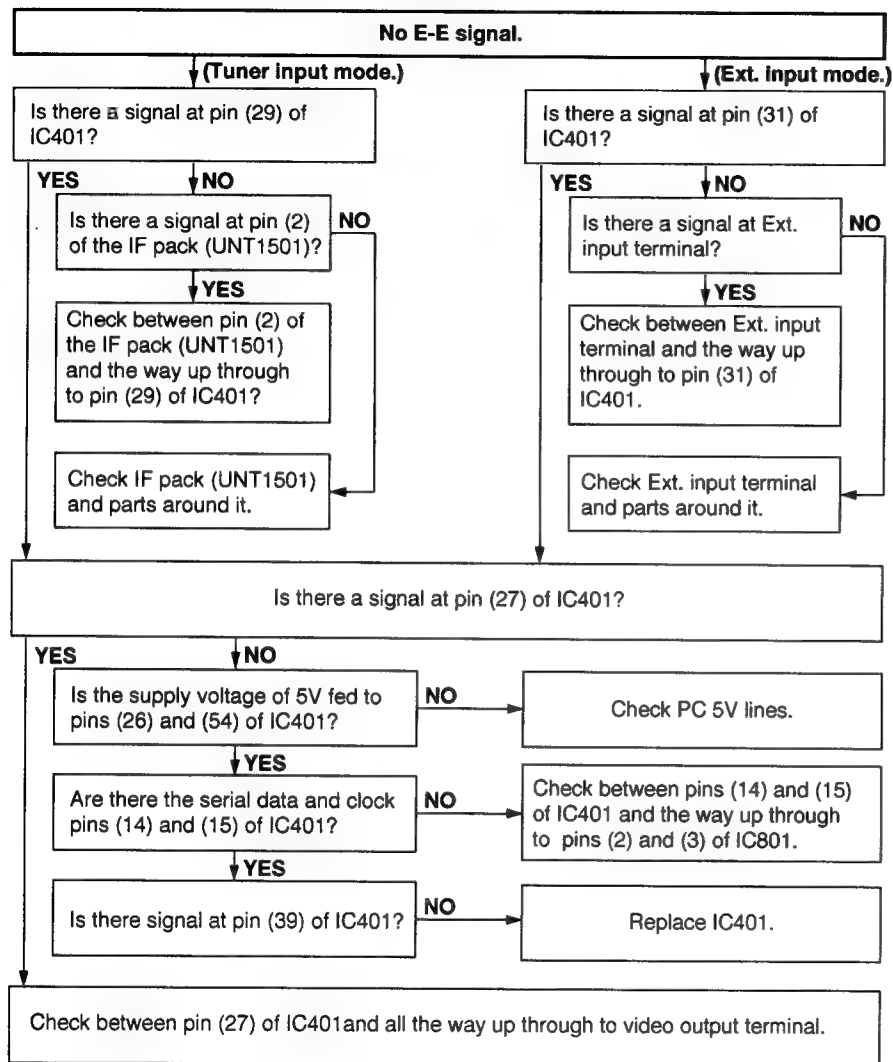




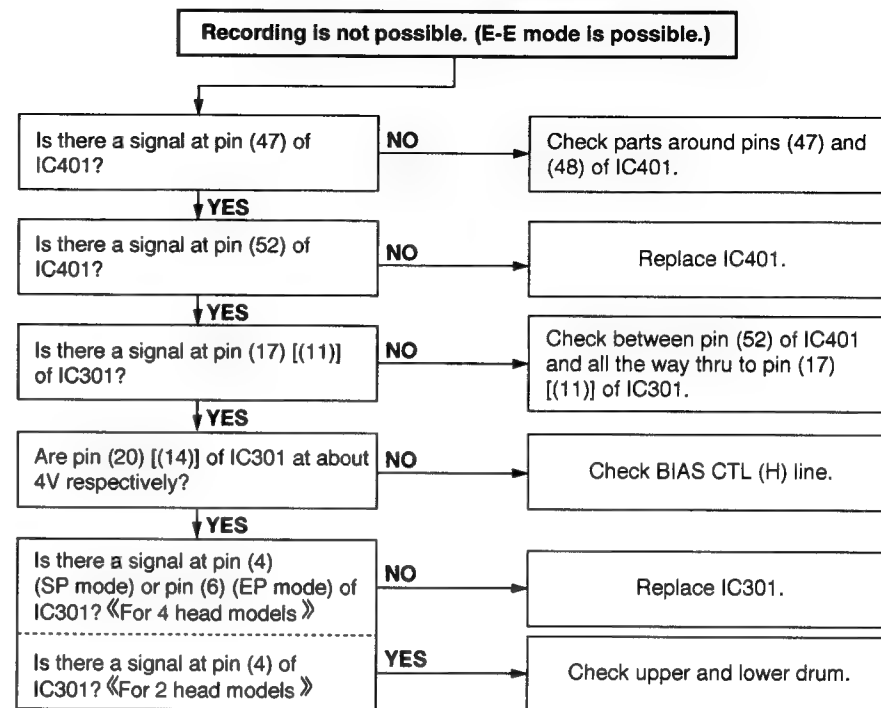
FLOW CHART NO.17 CAPSTAN SERVO TROUBLESHOOTING



FLOW CHART NO.18 E-E MODE TROUBLESHOOTING



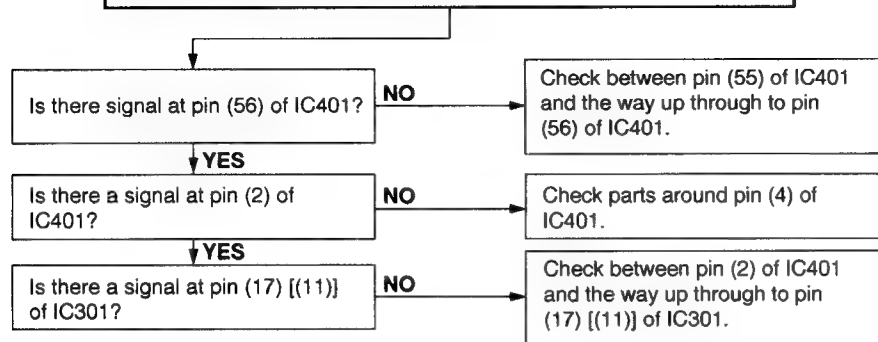
FLOW CHART NO.19 RECORDING MODE (LUMINANCE) TROUBLESHOOTING



Note: Words shown in the bracket "[ ]" are for the 2 head models only.

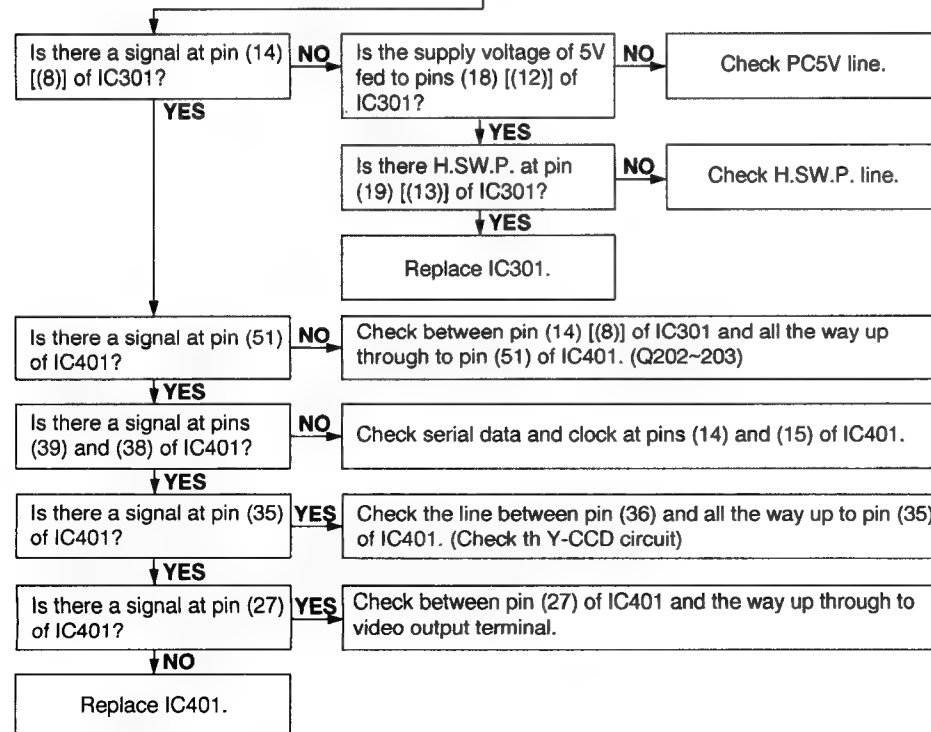
# **FLOW CHART NO.20 RECORDING MODE (CHROMA) TROUBLESHOOTING**

**Recording is possible but without colour. (E-E mode is possible.)**



# **FLOW CHART NO.21 PLAYBACK MODE (LUMINANCE) TROUBLESHOOTING**

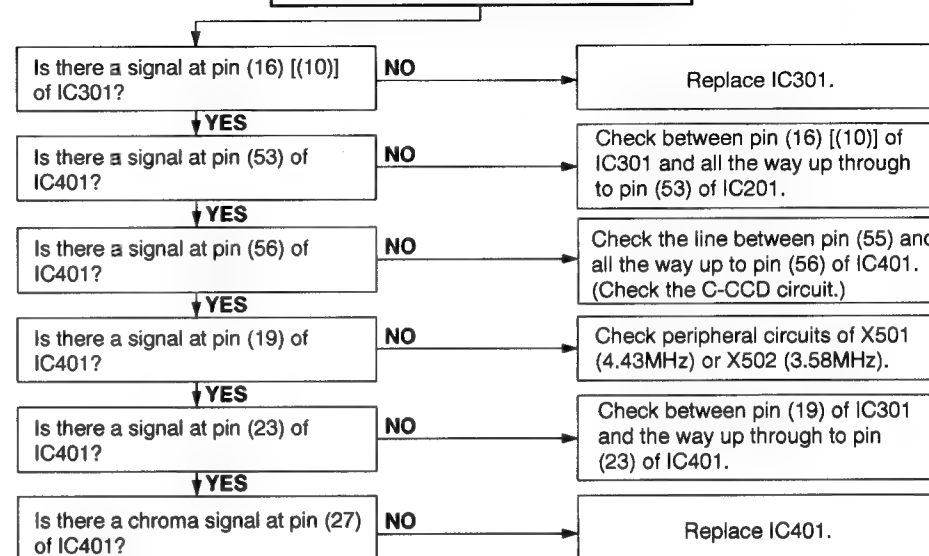
**Playback is not possible.**



Note: Words shown in the bracket "[ ]" are for the 2 head models only.

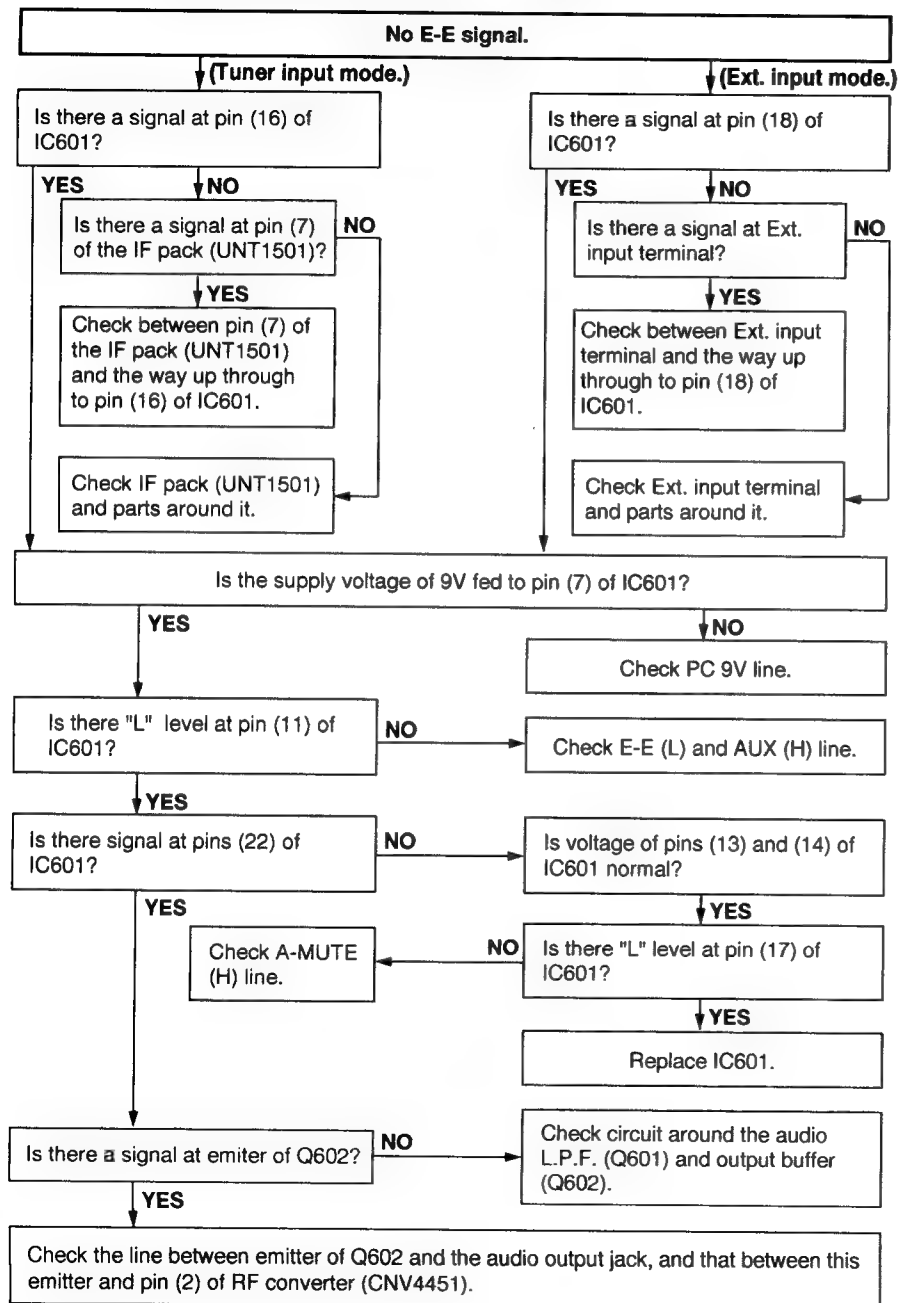
# **FLOW CHART NO.22 PLAYBACK MODE (CHROMA) TROUBLESHOOTING**

**Playback is possible but without colour.**

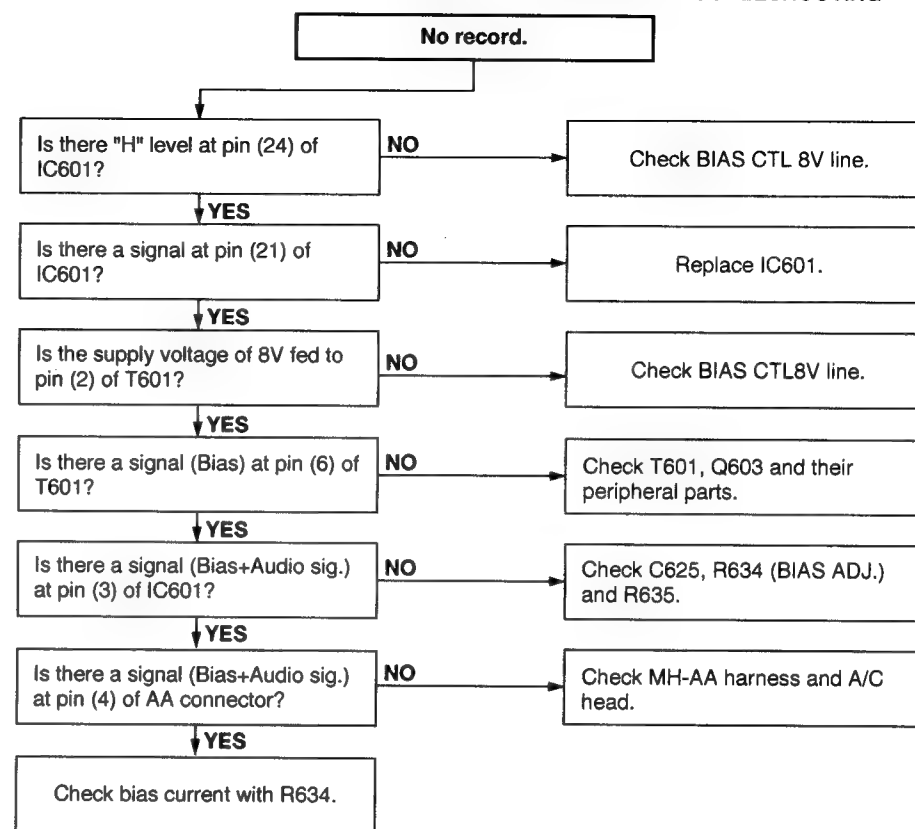


Note: Words shown in the bracket "[ ]" are for the 2 head models only.

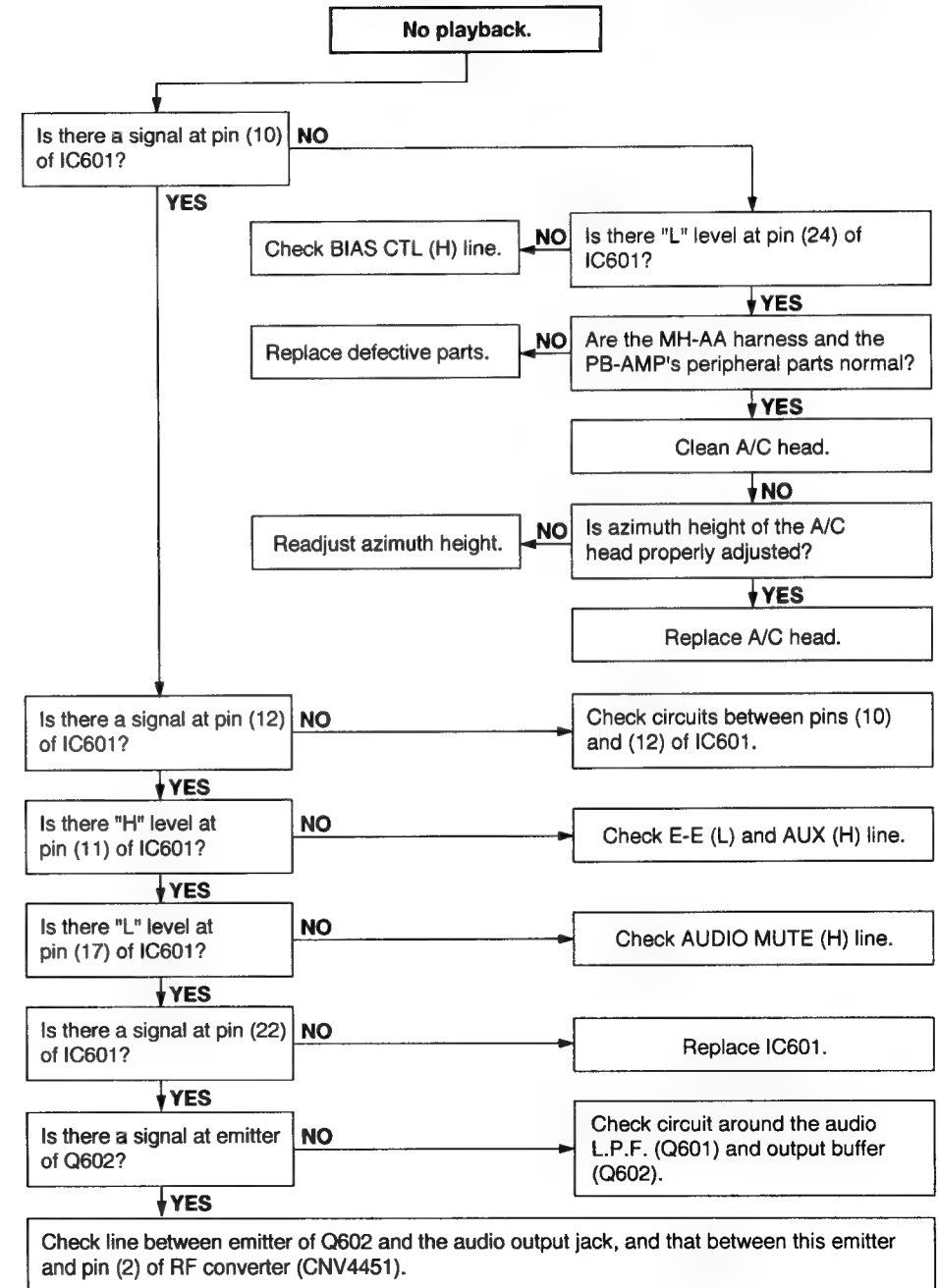
**FLOW CHART NO.23 LINEAR SOUND E-E MODE TROUBLESHOOTING**



**FLOW CHART NO.24 LINEAR SOUND RECORDING MODE TROUBLESHOOTING**



# FLOW CHART NO.25 LINEAR SOUND PLAYBACK MODE TROUBLESHOOTING



## REPLACEMENT OF IC804 (E<sup>2</sup>PROM)

«Servicing precautions»

When the IC804 (E<sup>2</sup>PROM) has been replaced, make the following reprogramming.

Depending on models, the IC804 (E<sup>2</sup>PROM) has been factory adjusted for its' memory function.

It's therefore necessary to reprogram the memory function for the model in question.

Note that the servo circuit requires readjustments for the slow and still modes.

Memory function reprogramming.

1. Check the power off. (power is standby mode)

2. Press the test key.

Be sure that all the fluorescent display tubes light up into the TEST mode.

3. Using the CHANNEL (+) and (–) buttons, select the right function numbers from among JP0-JP31, which appear in the fluorescent display tube, referring to the E<sup>2</sup>PROM map.

Press the DISPLAY button to pick up the functions (ON) and the CLEAR button to discard the functions (OFF).

DISPLAY and CLEAR buttons, are located on the remote control unit.

\* When the DISPLAY button has been pressed (ON), the memory function No. starts flashing.

\* When the CLEAR button has been pressed (OFF), the memory function No. lights up.

The numbers JP0 to JP31 are divided into four groups and each group's setting is displayed in hexadecimal notation.

J31	J30	J29	J28	J27	J26	J25	J24	J23	J22	J21	J20	J19	J18	J17	J16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		↓				↓				↓				↓	
		SPACE				0				0				0	
J15	J14	J13	J12	J11	J10	J09	J08	J07	J06	J05	J04	J03	J02	J01	J00
0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	1
		↓				↓				↓				↓	
		0				4				0				D	

"000040D" appears in the fluorescent display tube.

4. Finally press the test key to clear the TEST mode or press the OPERATE button to turn the power on.

# ROM MAP


	3746NE	3746CE	3746I	3746EP	4746NE	7456NE	374D	836NE
JP31 —	0	0	0	0	0	0	0	0
30 —	0	0	0	0	0	0	0	0
29 —	0	0	0	0	0	0	0	0
28 —	0	0	0	0	0	0	0	0
27 VS ENVE	1	1	1	1	1	1	1	1
26 —	0	0	0	0	0	0	0	0
25 HEAD 1	1	1	1	1	1	1	1	1
24 HEAD 0	0	0	0	0	0	0	0	0
23 Hi-Fi	0	0	0	0	0	0	0	0
22 AUTO CLOCK	1	1	1	1	1	1	1	1
AUTO SORTING	1	1	1	1	1	1	1	1
21 DECODER	0	1	0	1	0	0	1	0
20 SHUTTLE	0	0	0	0	0	0	0	0
19 NICAM 1	0	0	0	0	0	0	0	0
18 NICAM 0	0	0	0	0	0	0	0	0
17 G-CODE 1	0	0	0	0	0	0	0	0
16 G-CODE 0	1	1	1	1	1	1	1	1
15 OEM	0	0	0	0	1	1	0	0
14 LP	1	1	1	1	1	1	1	1
13 FRONT-AV	0	0	0	0	0	0	0	0
12 DUAL SCART	1	1	1	1	1	1	1	1
11 CATV/PIF	1	1	1	1	1	1	1	1
10 TUNER 2	0	0	0	0	0	0	0	0
9 TUNER 1	0	0	0	0	0	0	0	0
8 TUNER 0	0	0	0	0	0	0	0	0
7 REMAIN	1	1	1	1	1	1	1	1
6 DK/BG	0	0	0	0	0	0	0	0
5 VCR 1	1	1	1	1	1	1	1	1
4 VCR 0	0	0	0	0	0	0	0	0
3 PDC	1	1	0	0	1	1	1	1
2 VPS	1	1	0	0	1	1	1	1
1 COLOR 1	0	0	0	0	0	0	0	0
0 COLOR 0	0	0	0	0	0	0	0	0
DISPLAY	4108AC	A6158AC	A4158A0	A6158A0	A41D8AC	A41D8AC	A6158AC	4108AC

(Note: "1" : flashing "0" : lights up)

## SCHEMATIC DIAGRAM

### IMPORTANT SAFETY NOTICE:

BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET.

PARTS MARKED WITH "  " AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET.

BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

### SAFETY NOTES:

1. DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.
2. SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.

### NOTES:

1. The unit of resistance "ohm" is omitted ( $k=1000$  ohm,  $M=1$  Meg ohm).
2. All resistors are 1/8 watt, unless otherwise noted.
3. The unit of capacitance "F" is omitted ( $\mu=\mu F$ ,  $p=\mu\mu F$ ).
4. The values in parentheses are the ones in the PB mode; the values without parentheses are the ones in the REC mode.

### VOLTAGE MEASUREMENT CONDITIONS:

1. DC voltages are measured between points indicated and chassis ground by VTVM, with AC230V/50Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.
2. Voltages are measured with 10000 $\mu V$  B & W or colour noted.

### WAVEFORM MEASUREMENT CONDITIONS:

10000 $\mu V$  87.5 percent modulated colour bar signal is fed into tuner.

### CAUTION:

This circuit diagram is original one. Therefore there may be a slight difference from yours.

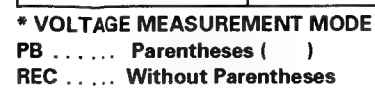


# MEMO

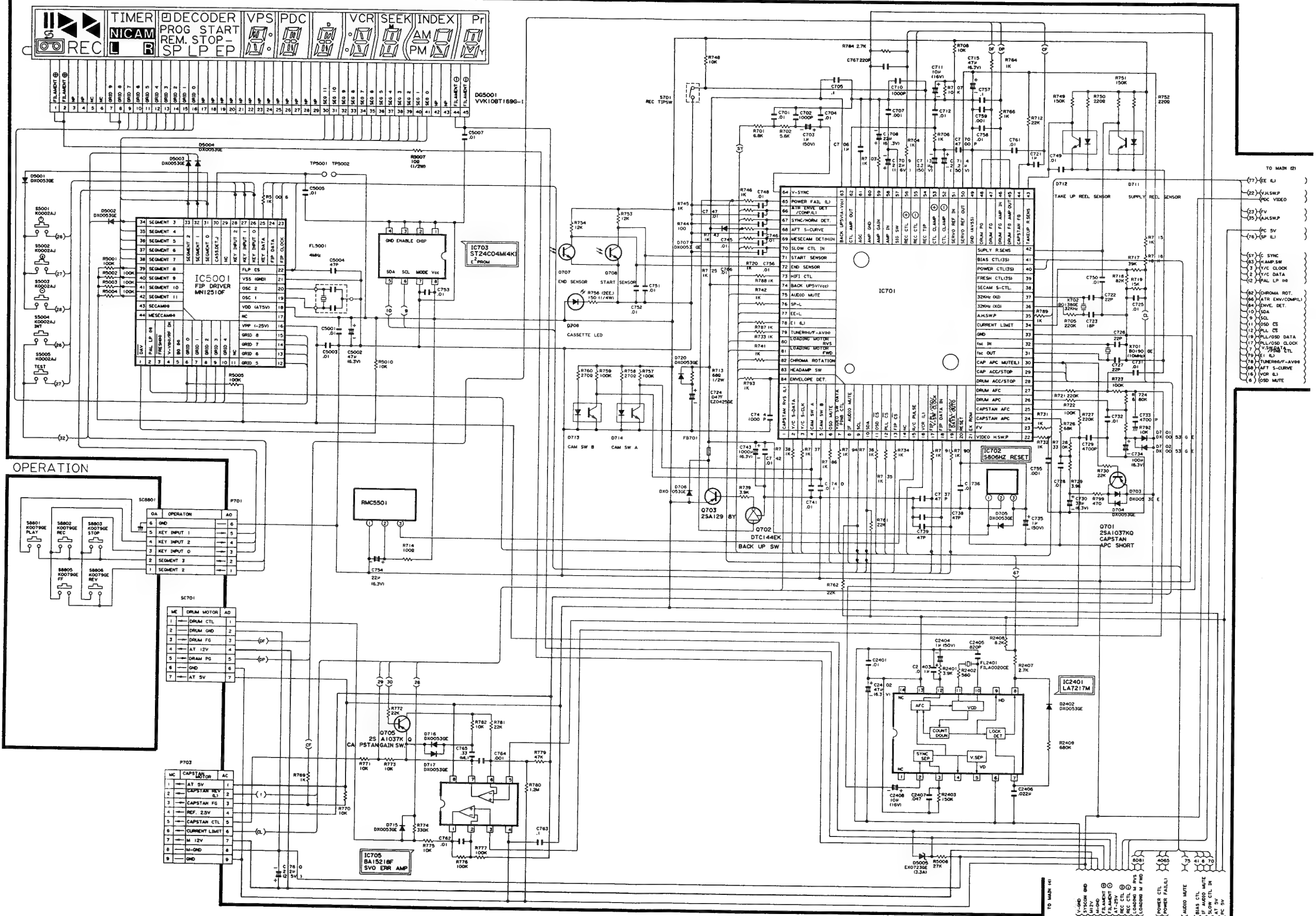
[illegible]

# MEMO

## MAIN (1) CIRCUIT (VCR3746NE/CE/4746NE/7456NE/374D/836NE)



# MAIN (1) CIRCUIT (VCR3746EP/I)



\* VOLTAGE MEASUREMENT MODE

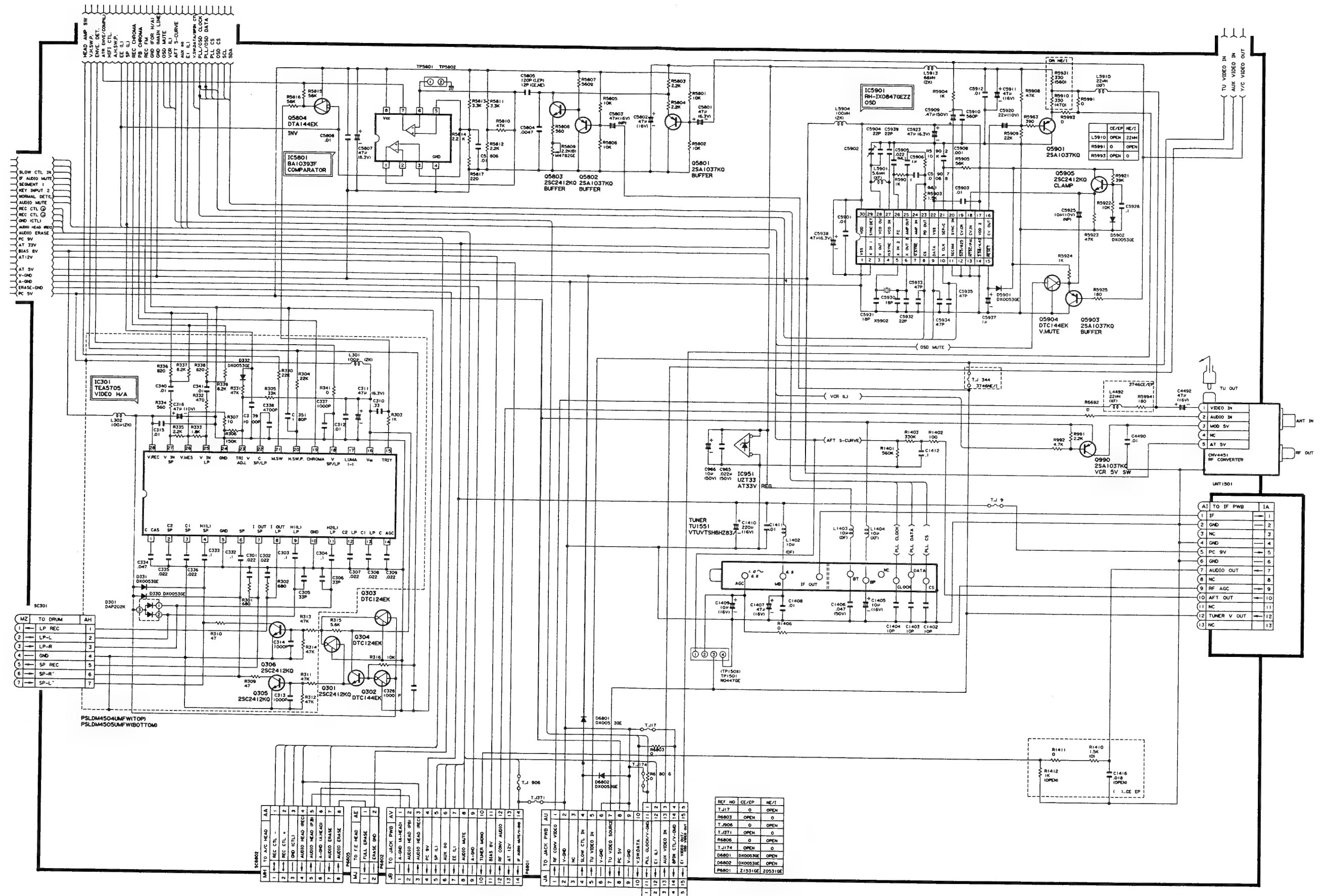
PB ..... Parentheses ( )  
 REC ..... Without Parentheses

# I



70

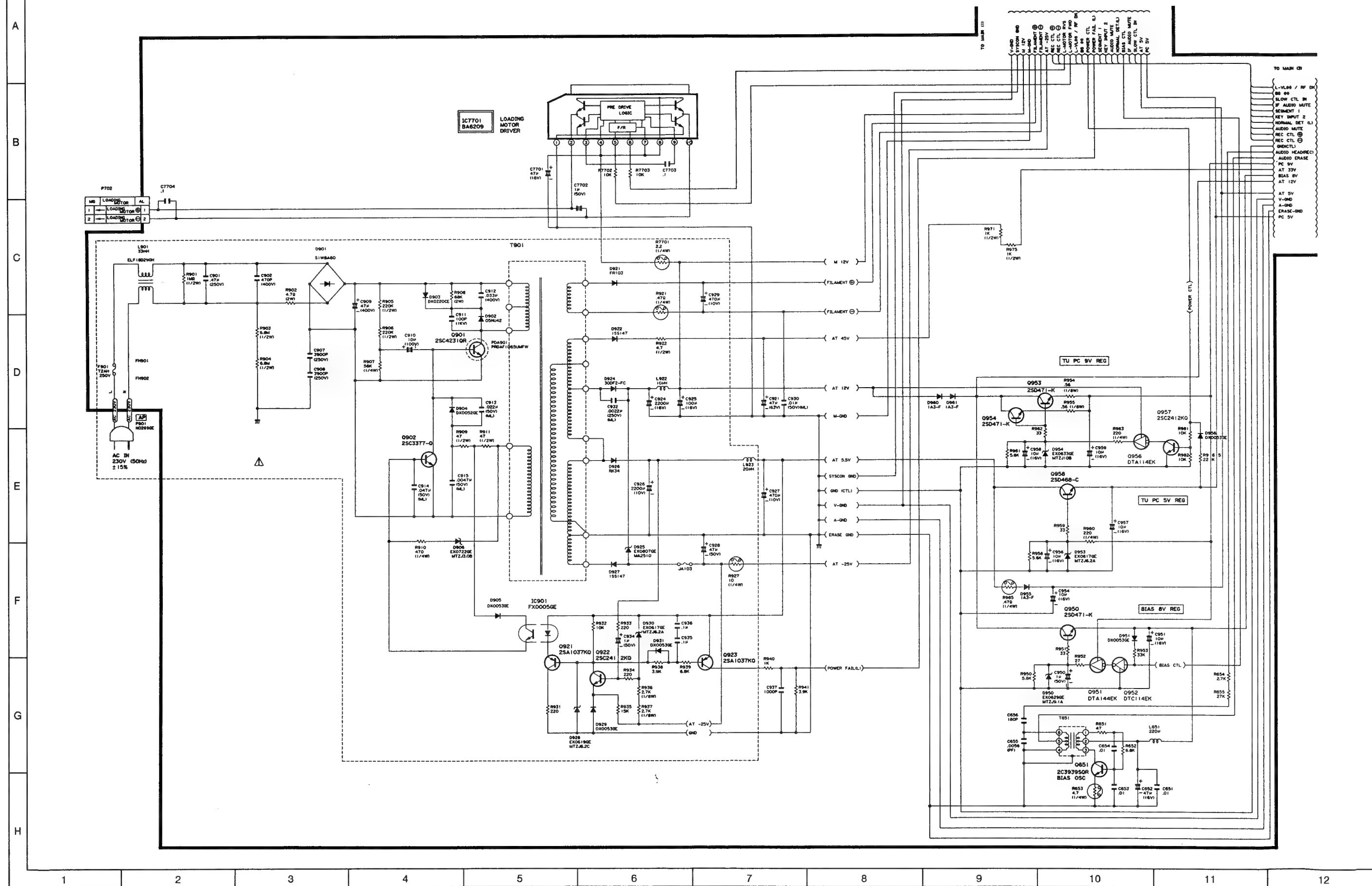
**MAIN (3) CIRCUIT (VCR3746NE/CE/EP/I/4746NE/7456NE/374D/836NE)**



\* VOLTAGE MEASUREMENT MODE

**PB . . . . .** Parentheses ( )  
**REC . . . . .** Without Parentheses

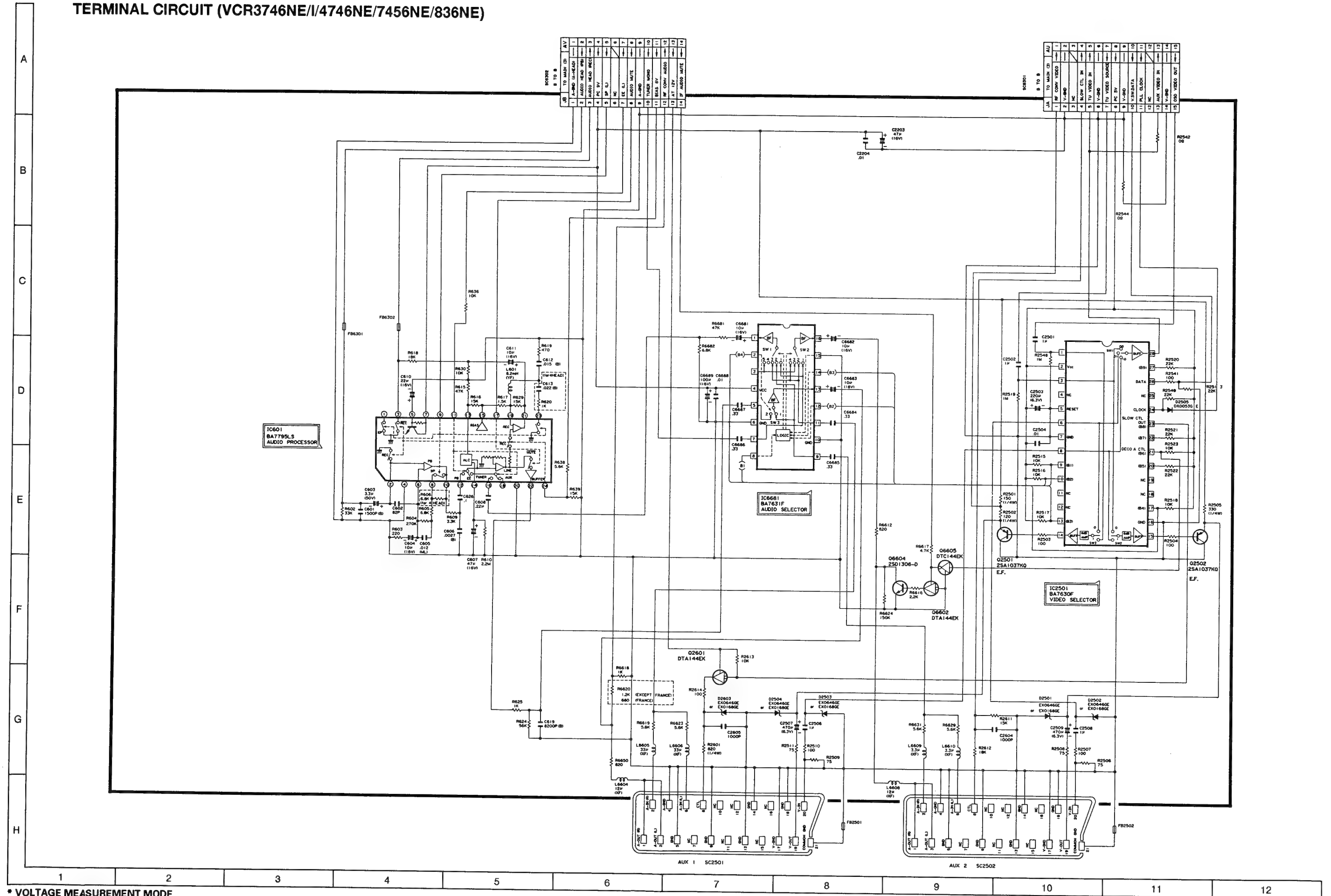
MAIN (4) CIRCUIT (VCR3746NE/CE/EP/1/4746NE/7456NE/374D/836NE)



\* VOLTAGE MEASUREMENT MODE  
PB ..... Parentheses ( )  
REC ..... Without Parentheses



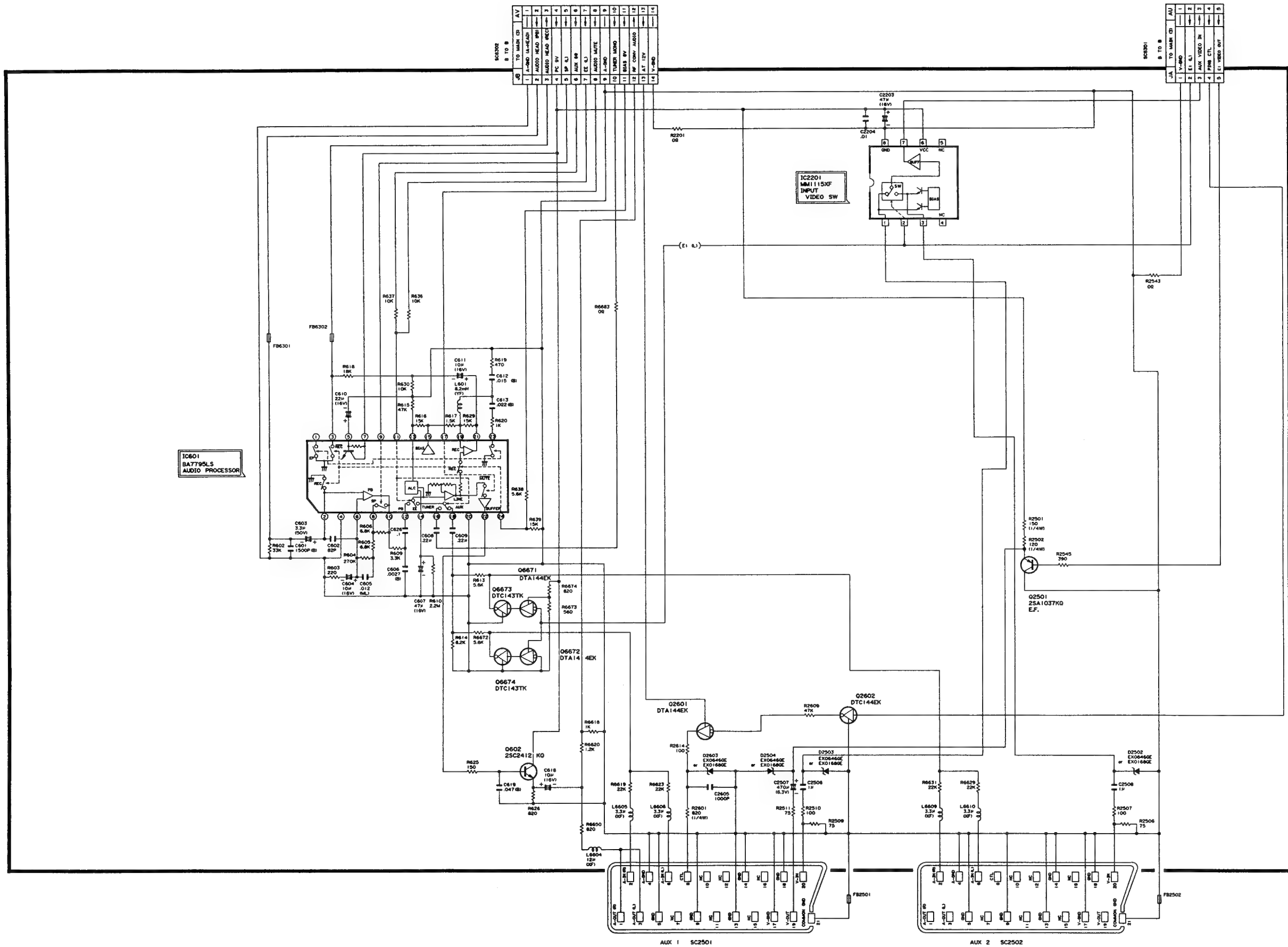
# TERMINAL CIRCUIT (VCR3746NE/I/4746NE/7456NE/836NE)





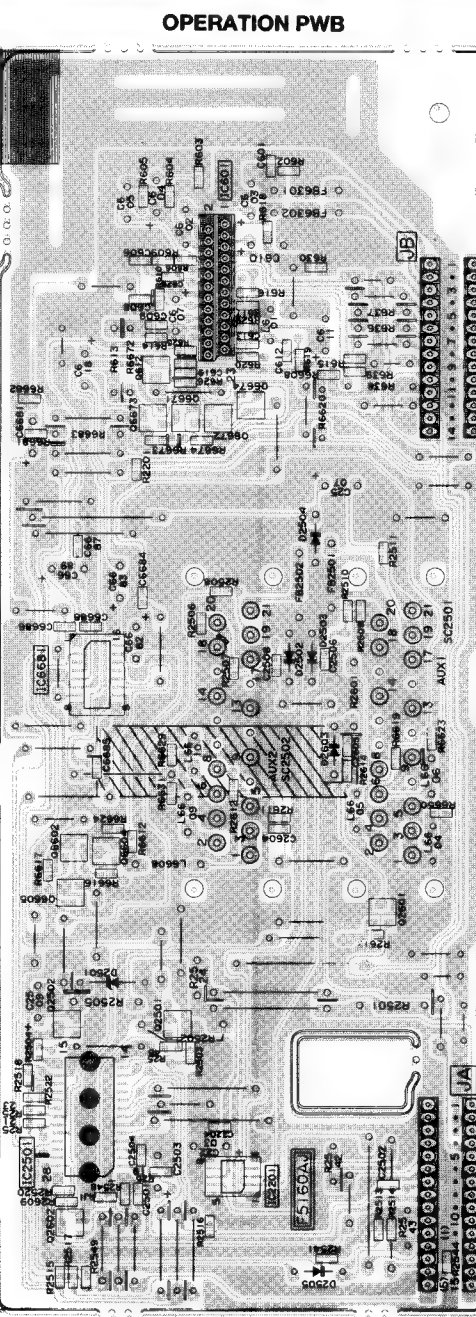
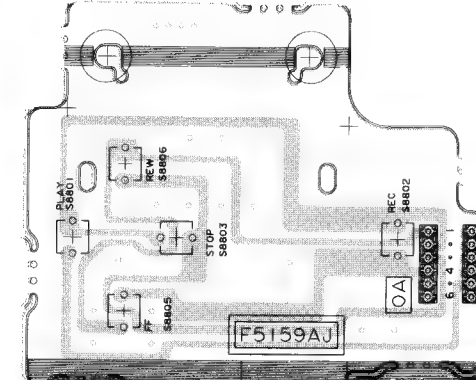
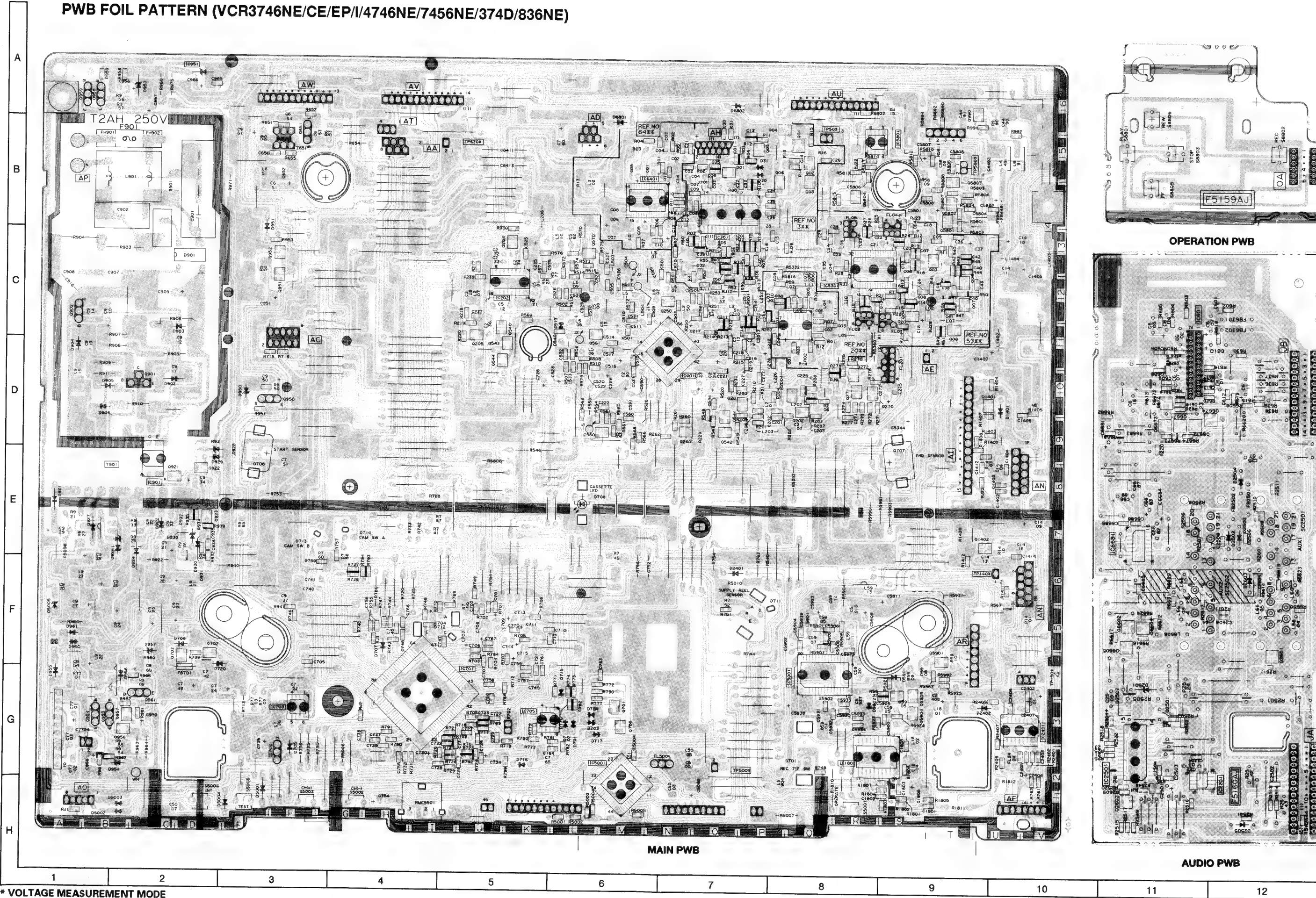
TERMINAL CIRCUIT (VCR3746CE/EP/374D)

A  
B  
C  
D  
E  
F  
G  
H




\* VOLTAGE MEASUREMENT MODE  
PB ..... Parentheses ( )  
REC ..... Without Parentheses

PWB FOIL PATTERN (VCR3746NE/CE/EP/1/4746NE/7456NE/374D/836NE)



\* VOLTAGE MEASUREMENT MODE  
PB ..... Parentheses ( )  
REC ..... Without Parentheses

## 10. REPLACEMENT PARTS LIST PARTS REPLACEMENT

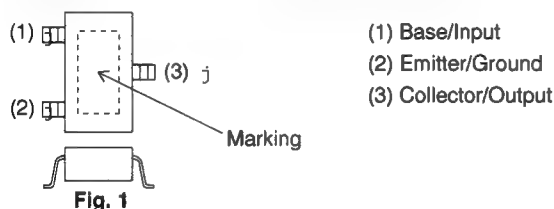
Many electrical and mechanical parts in video cassette recorder have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by  and shaded areas in the Replacement Parts Lists and Schematic Diagrams. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

### "HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

- |                 |                |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO.    |
| 3. PART NO.     | 4. DESCRIPTION |

### HOW TO IDENTIFY CHIP TRANSISTORS AND DIODES BY ITS MARKING



Package	Marking	Parts No.
Fig. 1	25	
Fig. 1	24	
Fig. 1	26	
Fig. 1	16	
Fig. 1	BQ	
Fig. 1	FQ	

MARK : SPARE PARTS-DELIVERY SECTION.

Ref. No.	Part No.	Description
<b>PRINTED WIRING BOARD ASSEMBLIES</b> (NOT REPLACEMENT ITEM)		

- Main Unit (VCR3746NE/836NE)
- Main Unit (VCR3746CE/374D)
- Main Unit (VCR3746I)
- Main Unit (VCR3746EP)
- Main Unit (VCR4746NE/7456NE)

Ref. No.	Part No.	Description
<b>MAIN UNIT ASSEMBLY</b>		
<b>TUNER AND ASSEMBLY</b>		
CNV4451	58260563	RF Converter
TU1551	58230625	VHF Tuner
UNT1501	58260565	IF-PACK Unit
<b>INTEGRATED CIRCUITS</b>		
IC202	37717029	IC MN3881S1E
IC301	37716994	IC TEA5705D013TR
IC401	37717028	IC HA8201CF1
IC601	37717003	IC BA 7795LS
IC701	37717056	Syscon/Servo/Timer (VCR3746CE/374D)
IC701	37717055	Syscon/Servo/Timer (VCR3746EP)
IC701	37717054	Syscon/Servo/Timer (VCR3746I)
IC701	37717060	Syscon/Servo/Timer (VCR3746NE/4746NE/ 7456NE/836NE)
IC702	37717007	IC S 806HZ
IC703	37717040	E <sup>2</sup> PROM
IC705	37717005	IC BA 15128
IC951	37717011	IC UZT33
IC1801	37717037	IC SDA5649X (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)
IC2001	37717030	IC TEA5750
IC2201	37717041	IC MM1115 XF (VCR3746NE/I/4746NE/ 7456NE/836NE)
IC2401	37716993	IC LA7217M
IC2501	37716997	IC BA 7630F (VCR3746CE/EP)
IC5001	37716998	IC MN 12510F
IC5801	37716183	IC BA 10393F (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)
IC5901	37717031	OSD
IC6681	37717004	IC BA 7631F (VCR3746CE/EP/374D)
IC7701	37715089	IC BA 6209 (VCR3746NE/CE/EP/4746NE/ 7456NE/374D/836NE)
<b>TRANSISTORS</b>		
Q202	36145507	2SC2412KQ
Q203	36147830	2SA1037KQ
Q204	36145507	2SC2412KQ
Q205	36147830	2SA1037KQ
Q250	36144469	DTC144EK (VCR4746NE)
Q260	36147830	2SA1037KQ
Q301	36145507	2SC2412KQ
Q302	36144469	DTC144EK
Q303	36144633	DTC124EK
Q304	36144633	DTC124EK



Ref. No.	Part No.	Description
<b>TRANSISTORS (Continued)</b>		
Q305	36145507	2SC2412KQ
Q306	36145507	2SC2412KQ
Q540	36144469	DTC144EK
Q543	36144469	DTC144EK
Q602	36145507	2SC2412KQ (VCR3746NE/I/4746NE/ 7456NE/836NE)
Q651	36147836	2SC3939SQR
Q701	36147830	2SA1037KQ
Q702	36144469	DTC144EK
Q703	36147831	2SA1298Y
Q705	36147830	2SA1037KQ
⚠ Q901	36147838	2SC4231Q
⚠ Q902	36147832	2SC3377Q
Q921	36147830	2SA1037KQ
Q922	36145507	2SC2412KQ
Q923	36147830	2SA1037KQ
Q950	36147835	2SD471KL
Q951	36144628	DTA144EK
Q952	36144480	DTC114EK
Q953	36147835	2SD471KL
Q954	36147835	2SD471KL
Q956	36144302	DTA114EK
Q957	36145507	2SC2412KQ
Q958	36144098	2SD468C
Q990	36147830	2SA1037KQ
Q2501	36147830	2SA1037KQ
Q2502	36147830	2SA1037KQ (VCR3746CE/EP/374D)
Q2601	36144628	DTA144EK
Q2602	36144469	DTA144EK (VCR3746NE/I/4746NE/ 7456NE/836NE)
Q5801	36147830	2SA1037KQ
Q5802	36147830	2SA1037KQ
Q5803	36145507	2SC2412KQ
Q5804	36144628	DTA144EK
Q5901	36147830	2SA1037KQ
Q5903	36147830	2SA1037KQ
Q5904	36144469	DTA144EK
Q5905	36145507	2SC2412KQ
Q6602	36144628	DTA144EK (VCR3746CE/EP/374D)
Q6604	36147834	2SD1306 (VCR3746CE/EP/374D)
Q6605	36144469	DTC144EK (VCR3746CE/EP/374D)
Q6671	36144628	DTA144EK (VCR3746NE/I/4746NE/ 7456NE/836NE)
Q6672	36144628	DTA144EK (VCR3746NE/I/4746NE/ 7456NE/836NE)

Ref. No.	Part No.	Description
<b>TRANSISTORS (Continued)</b>		
Q6673	36147840	DTC143TK (VCR3746NE/I/4746NE/ 7456NE/836NE)
Q6674	36147840	DTC143TK (VCR3746NE/I/4746NE/ 7456NE/836NE)
<b>DIODES</b>		
D301	36562981	Chip Diode
D330	36562889	1SS132
D331	36562889	1SS132
D332	36562889	1SS132
D540	36562889	1SS132
D701	36562889	1SS132
D702	36562889	1SS132
D703	36562889	1SS132
D704	36562889	1SS132
D705	36562889	1SS132
D706	36562889	1SS132
D707	36562889	1SS132
D708	36563773	Photodiode
D711	36563780	Reel Sensor
D712	36563780	Reel Sensor
D713	36563779	Mecha-posi Sensor
D714	36563779	Mecha-posi Sensor
D715	36562889	1SS132
D716	36562889	1SS132
D717	36562889	1SS132
D720	36562889	1SS132
⚠ D901	36563781	Diode Bridge
D902	3653801	Diode 05N442
⚠ D903	36563782	Diode
D904	36562889	Diode
D905	36562889	1SS132
D906	36563802	Zener Diode MTZJ3.0B
D921	36563771	FR103
D922	36563798	1SS147
⚠ D924	36563772	30DF2-FC
D925	36563785	Zener Diode
D926	36563789	Zener Diode
D927	36563798	1SS147
D928	36562889	Zener Diode 6.2V 83
D929	36562889	1SS132
D930	36563799	Zener Diode
D931	36562889	1SS132
D950	36563804	Zener Diode MTZJ9.1A
D951	36562889	1SS132
D953	36563799	Zener Diode
D954	36563805	Zener Diode MTZJ10B
D955	36563774	Diode
D956	36562889	1SS132
D960	36563774	1A3-F
D961	36563774	Diode
D2402	36562889	1SS132

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>DIODES (Continued)</b>			<b>COILS AND TRANSFORMERS (Continued)</b>		
D2501	36563796	Zener Diode 15V B1 (VCR3746CE/EP/374D)	L503	45434183	Coil 2.7μH
D2502	36563796	Zener Diode 15V B1	L504	45434147	Coil 15μH
D2503	36563796	Zener Diode 15V B1	L505	45434192	Inductor 10μH
D2504	36563796	Zener Diode 15V B1	L506	45434193	Coil 39μH
D2505	36562889	1SS132 (VCR3746CE/EP/374D)	L509	45434194	Inductor 150μH
D2603	36563796	Zener Diode 15V B1 (VCR3746NE//EP/4746NE/ 7456NE/836NE)	L510	45434174	Coil 12μH
D5001	36562889	1SS132	L511	45434151	Coil 68μH
D5002	36562889	1SS132	L601	45434156	Coil 8200μH
D5003	36562889	1SS132	L651	45434154	Coil 220μH
D5004	36562889	1SS132	⚠ L901	45526702	Coil
D5005	36563797	Zener Diode MTZJ6,2A	L922	45434158	Coil 10μH
D5901	36562889	1SS132	L923	45434171	Coil 22μH
D5902	36562889	1SS132	L1402	45434172	Coil 10μH
D6801	36562889	1SS132 (VCR3746CE/EP/374D)	L1403	45434148	Coil 10μH
D6802	36562889	1SS132 (VCR3746CE/EP/374D)	L1404	45434148	Coil 10μH (VCR3746NE/CE//EP/ 374D/836NE)
⚠ IC901	37717010	Photo Coupler	L1801	45434179	Coil 8.2μH (VCR4746NE/7456NE)
Q707	36563775	Photodiode	L1802	45434179	Coil 8.2μH (VCR3746NE/4746NE/ 7456NE/836NE)
Q708	36563775	Photodiode	L2001	45434195	Coil 120μH
<b>PACKAGED CIRCUITS</b>			L2002	45434173	Coil 47μH
X501	44212280	Crystal 4.43MHZ	L2003	45434185	Coil 47μH
X701	44212282	Crystal 10 MHZ	L2004	45434193	Coil 39μH
X702	44212283	Crystal 32.678 KHZ	L2005	45434196	Coil 68μH
X5902	44212286	Crystal	L4492	45434177	Coil 22μH (VCR3746CE/EP/374D)
<b>COILS AND TRANSFORMERS</b>			L5901	45434178	Coil 5.6μH
FL2401	45526894	Filter LA0020	L5904	45434152	Coil 100μH
FL5001	45526895	Filter	L5910	45434177	Coil 22μH (VCR3746NE//4746NE/ 7456NE/836NE)
L201	45434184	Coil 100μH	L5913	45434176	Coil 68μH
L202	45434185	Coil 47μH	L6604	45434131	Coil 12μH
L203	45434172	Coil 10μH (VCR3746NE//EP/4746NE/ 7456NE/836NE)	L6605	45434137	Coil 3.3μH
L205	45434190	Inductor 82μH (VCR3746NE/4746NE/ 7456NE/836NE)	L6606	45434137	Coil 3.3μH
L205	45434180	Inductor 180μH (VCR3746CE//EP/374D)	L6608	45434141	Coil 12μH (VCR3746EP)
L206	45434186	Coil 2.7μH	L6609	45434137	Coil 3.3μH
L207	45434187	Inductor 56μH	L6610	45434137	Coil 3.3μH (VCR3746NE/CE//EP/ 374D/836NE)
L250	45434188	Coil 6.8μH	T651	45113544	OSC. Transformer
L251	45434189	Coil 22μH	⚠ T901	45113548	Power Transformer
L252	45434190	Inductor 82μH (VCR3746NE/CE//4746NE/ 7456NE/374D/836NE)	<b>CAPACITORS</b>		
L253	45434191	Inductor 68μH	C201	390p 50V S Chip	
L301	45434152	Coil 100μH	C202	680p 50V S Chip (VCR3746NE/CE//EP/ 7456NE/374D/836NE)	
L302	45434152	Coil 100μH	C202	330p 50V S Chip (VCR4746NE)	
L501	45434175	Coil 560μH			

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CAPACITORS (Continued)</b>			<b>CAPACITORS (Continued)</b>		
C203		22p 50V S Chip (VCR4746NE)	C253		220p 50V S Chip (VCR3746CE/374D)
C203		27p 50V S Chip (VCR3746NE/7456NE/ 836NE)	C253		82p 50V S Chip (VCR3746NE//EP/7456NE/ 836NE)
C207		22p 50V S Chip (VCR3746NE//EP/4746NE/ 7456NE/836NE)	C254		680p 50V S Chip (VCR3746NE/CE//EP/ 7456NE/374D/836NE)
C210		0.1 25V S Chip	C254		390p 50V S Chip (VCR4746NE)
C211		10p 50V S Chip	C255		68p 50V S Chip (VCR3746CE/4746NE/ 374D)
C212		0.47 50V Electrolytic			
C213		0.001 50V S Chip	C301		0.022 50V S Chip
C214		0.22 50V Electrolytic	C302		0.022 50V S Chip
C215		100p 50V S Chip	C303		0.1 25V S Chip
C216		10p 50V S Chip (VCR3746NE/CE/EP/4746NE/ 7456NE/374D/836NE)	C304		0.1 50V Ceramic
C217		1.0 50V Electrolytic	C305		33p 50V S Chip
C218		0.01 50V S Chip	C306		33p 50V S Chip
C219		0.022 25V S Chip	C307		0.022 50V S Chip
C220		3.3 50V Electrolytic	C308		0.022 50V S Chip
C221		0.047 50V S Chip	C309		0.022 50V S Chip
C222		0.1 25V S Chip	C310		0.33 16V S Chip
C223		3.3 50V Electrolytic	C311		47 6.3V Electrolytic
C224		2.2 50V Electrolytic (VCR3746NE//EP/4746NE/ 7456NE/836NE)	C312		0.01 50V S Chip
			C313		0.001 50V S Chip
C225		10 16V Electrolytic	C314		0.001 50V S Chip
C226		0.47 50V Electrolytic	C315		0.01 50V S Chip
C227		10 16V Electrolytic	C316		47 10V Electrolytic (VCR3746NE//EP/4746NE/ 7456NE/836NE)
C228		0.22 50V Electrolytic			
C229		0.1 50V Ceramic	C326		0.001 50V S Chip
C230		47 6.3V Electrolytic	C330		33p 50V S Chip
C232		0.01 16V Ceramic	C331		33p 50V S Chip
C233		0.01 16V Ceramic	C332		0.1 25V S Chip
C234		0.01 16V Ceramic	C333		0.1 25V S Chip
C235		10 16V Electrolytic	C334		0.047 50V S Chip
C236		0.1 50V Ceramic	C335		0.022 50V S Chip
C237		33p 50V S Chip (VCR3746CE//4746NE/374D)	C336		0.022 50V S Chip
C237		100p 50V S Chip (VCR3746NE/EP/7456NE/ 836NE)	C337		0.001 50V S Chip
			C338		0.0047W 50V S Chip
C238		4.7p S Chip	C339		0.001 50V S Chip
C239		56p 50V S Chip	C340		0.01 50V S Chip
C250		33p 50V S Chip (VCR3746NE//EP/7456NE/ 836NE)	C341		0.01 50V S Chip
			C350		0.01 50V S Chip (VCR3746CE/4746NE/ 374D)
C250		56p 50V S Chip (VCR3746CE/4746NE/ 374D)	C501		0.0033 50V S Chip
			C503		0.01 50V S Chip
C251		18p 50V S Chip (VCR3746CE/EP/374D)	C504		47 6.3V Electrolytic
			C505		0.047 50V S Chip
C253		330p 50V S Chip (VCR4746NE)	C506		0.01 16V Ceramic
			C508		0.01 16V Ceramic
			C509		0.015 25V S Chip
			C510		3.3 50V Electrolytic

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CAPACITORS (Continued)</b>			<b>CAPACITORS (Continued)</b>		
C511		33p 50V S Chip	C618		10 16V Electrolytic (VCR3746NE//4746NE/ 7456NE/836NE)
C512		0.01 16V Ceramic	C619		0.047 16V S Chip (VCR3746NE/4746NE/ 7456NE/836NE)
C513		0.1 16V S Chip	C619		0.0082 25V S Chip (VCR3746CE/EP/374D)
C514		0.033 16V S Chip (VCR3746NE//EP/4746NE/ 7456NE/836NE)	C626		0.1 25V S Chip
C515		0.1 16V S Chip	C651		0.01 16V Ceramic
C516		4.7 50V Electrolytic (VCR4746NE/745NE)	C652		47 16V Electrolytic (VCR3746CE//EP/4746NE/ 7456NE/374D)
C517		18p 50V S Chip	C653		0.01 16V Ceramic
C520		0.47 50V Electrolytic	C654		0.01 16V Ceramic
C521		0.022 50V S Chip	C655		0.0056 100V Mylar
C523		10 16V Electrolytic	C656		180p 50V S Chip
C522		0.1 25V S Chip	C701		0.01 50V S Chip
C525		0.01 50V S Chip	C702		0.001 50V S Chip
C526		68p 50V S Chip	C703		1.0 50V Electrolytic
C527		47p 50V S Chip	C704		0.01 50V S Chip
C528		56p 50V S Chip	C705		0.1 25V S Chip
C529		4.7 50V Electrolytic	C706		1.0 10V S Chip (VCR3746CE//EP/4746NE/ 7456NE/374D)
C530		120p 50V S Chip	C707		0.001 50V S Chip
C531		1.0p 50V S Chip	C708		22 6.3V Electrolytic
C532		47p 50V S Chip	C709		22 16V Electrolytic
C533		47p 50V S Chip	C710		0.001 50V S Chip
C536		180p 50V S Chip	C711		10 16V Electrolytic
C537		0.01 50V S Chip (VCR3746NE/CE/EP/4746NE/ 7456NE/374D/836NE)	C712		0.01 50V S Chip
C562		27p 50V Ceramic	C713		2.2 50V Electrolytic
C590		0.01 16V Ceramic (VCR3746//EP/4746NE/ 7456NE)	C714		2.2 50V Electrolytic
C599		33p 50V S Chip (VCR3746NE//EP/7456NE/ 836NE)	C715		47 6.3V Electrolytic
C601		0.0015 50V Ceramic	C721		1.0 10V S Chip (VCR3746CE//EP/4746NE/ 7456NE/374D)
C602		82p 50V Ceramic (VCR3746CE//EP/4746NE/ 7456NE/374D)	C722		22p 50V S Chip
C603		3.3 50V S Chip	C723		18p 50V S Chip
C604		10 16V Electrolytic	C724		Capacitor
C605		Capacitor	C725		0.01 50V S Chip
C606		0.0027 50V Ceramic	C726		22p 50V S Chip
C607		47 16V Electrolytic	C727		22p 50V S Chip
C608		0.22 16V Electrolytic	C728		0.01 50V S Chip
C609		0.22 16V Electrolytic (VCR3746NE//4746NE 7456NE/836NE)	C729		0.0047 50v S Chip
C610		22 16V Electrolytic	C730		33 6.3V Electrolytic
C611		10 16V Electrolytic	C731		0.01 50V S Chip
C612		0.015 25V S Chip	C732		0.01 50V S Chip
C613		0.022 25V S Chip (VCR3746CE//EP/4746NE/ 7456NE/374D)	C733		0.0047 50V S Chip
			C734		100 6.3V Electrolytic
			C735		1.0 50V Electrolytic
			C736		0.01 16V Ceramic
			C737		47p 50V S Chip
			C738		47p 50V S Chip
			C739		47p 50V S Chip

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
CAPACITORS (Continued)			CAPACITORS (Continued)		
C740		0.01 16V Ceramic	C934		1.0 50V Electrolytic
C741		0.01 50V S Chip	C935		0.1 25V S Chip
		(VCR3746CE/I/374D)	C936		0.1 25V S Chip
C741		0.01 16V Ceramic	C937		0.001 50V S Chip
		(VCR3746NE/EP/4746NE/ 7456NE/836NE)	C950		1.0 50V Electrolytic
C742		0.01 16V Ceramic	C951		10 16V Electrolytic
C743		1000 6.3V Electrolytic	C954		10 16V Electrolytic
C744		0.001 50V S Chip	C956		10 16V Electrolytic
C745		0.01 50V S Chip	C957		10 16V Electrolytic
C746		0.01 50V S Chip	C958		10 16V Electrolytic
C747		0.01 50V S Chip	C959		10 16V Electrolytic
C748		0.01 50V S Chip	C965		0.022 50V S Chip
C749		0.01 50V S Chip			(VCR3746CE/I/EP/4746NE/ 7456NE/374D)
C750		0.01 50V S Chip	C966		10 50V Electrolytic
C751		0.01 16V Ceramic	C1402		10p 50V S Chip
C752		0.01 16V Ceramic	C1403		10p 50V S Chip
C753		0.01 16V Ceramic	C1404		10p 50V S Chip
C754		22 6.3V Electrolytic	C1405		10 16V Electrolytic
C755		0.001 50V S Chip			(VCR3746NE/I/EP/4746NE/ 7456NE/836NE)
C756		0.1 50V S Chip	C1406		0.047 50V Ceramic
		(VCR3746CE/I/EP/374D)	C1407		47 16V Electrolytic
C757		0.1 25V S Chip	C1408		0.01 50V S Chip
C758		0.01 50V S Chip	C1409		10 16V Electrolytic
C759		0.001 50V S Chip	C1410		220 16V Electrolytic
C760		22 25V Electrolytic	C1411		0.01 16V Ceramic
C761		0.01 50V S Chip	C1412		0.1 25V S Chip
C762		0.01 25V S Chip	C1416		0.018 50V Mylar
C763		0.1 25V S Chip			(VCR3746NE/I/7456NE/ 836NE)
C764		0.001 50V S Chip	C1416		0.0068 50V Mylar
C765		Capacitor			(VCR4746NE)
C767		220p 50V S Chip	C1801		0.033 16V S Chip
C768		0.039 50V Mylar			(VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)
		(VCR3746I/4746NE/7456NE)	C1802		0.022 50V S Chip
C770		0.0047 50V S Chip			(VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)
△ C901	32619089	Capacitor	C1803		0.033 16V S Chip
C902	32619086	Capacitor			(VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)
△ C907	32619085	Capacitor	C1804		150p 50V Ceramic
△ C908	32619085	Capacitor			(VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)
△ C909	32619073	Capacitor	C1805		0.1 16V S Chip
△ C910	32619088	10 100V Electrolytic			(VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)
C911	32619074	Capacitor	C1806		47 16V Electrolytic
△ C912	32619090	0.033 400V Metal			(VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)
△ C913	32619094	0.022 Mylar	C2001		1.0 50V Electrolytic
C914		Capacitor			(VCR3746CE/I/EP/4746NE/ 7456NE/374D)
C915		Capacitor	C2002		82p 50V S Chip
C921		47 63V Electrolytic			
C924		2200 16V S Chip			
C925		100 16V Electrolytic			
C926		2200 10V S Chip			
C927		470 10V Electrolytic			
C928		47 50V Electrolytic			
C929		470 10V Electrolytic			
C930		0.01 50V S Chip			
C932	32619087	0.0022 250V S Chip			



Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CAPACITORS (Continued)</b>			<b>CAPACITORS (Continued)</b>		
C2003		0.01 50V S Chip	C5801	47	6.3V Electrolytic
C2004		0.01 50V S Chip	C5802	47	16V Electrolytic
C2005		220p 50V S Chip	C5803	47	16V Electrolytic
C2006		0.01 50V S Chip			(VCR3746NE/CE/EP
C2007		47p 50V S Chip			7156NE/374D/836NE)
		(VCR3746CE//EP/4746NE/	C5804	0.047	50V Ceramic
		7456NE/374D)	C5805	0.01	50V S Chip
C2008		0.01 50V S Chip			(VCR4746NE)
C2009		100p 50V S Chip	C5805	120p	50V S Chip
		(VCR3746NE//EP/			(VCR3746NE/CE//7456NE/
		7456NE/836NE)			374D/836NE)
C2009		82p 50V S Chip	C5806	0.01	50V S Chip
		(VCR3746CE/4746NE/374D)	C5807	47	6.3V Electrolytic
C2011		47 6.3V Electrolytic	C5808	0.01	50V S Chip
C2012		0.1 25V S Chip	C5901	0.01	16V Ceramic
C2203		47 16V Electrolytic	C5902	32619091	Trimmer
C2204		0.01 50V Ceramic	C5903		0.01 50V S Chip
		(VCR3746NE//EP/4746NE/	C5904		22p 50V S Chip
		7456NE/836NE)	C5905	32619094	0.022 Mylar
C2207		47p 50V S Chip	C5906		1.0 10V S Chip
		(VCR3746NE)	C5907		Capacitor
C2401		0.01 50V S Chip	C5908		0.001 50V S Chip
C2402		47 6.3V Electrolytic	C5909		0.47 50V Electrolytic
		(VCR3746CE//EP/4746NE/	C5910		560p 50V Ceramic
		7456NE/374D)	C5911		47 16V Electrolytic
C2403		0.01 50V S Chip			(VCR3746CE//EP/4746NE/
C2404		1.0 50V Electrolytic			7456NE/374D)
C2405		820p 50V S Chip	C5912		0.1 16V Ceramic
C2406		0.022 50V S Chip			(VCR3746CE//EP/4746NE/
C2407		0.047 16V Ceramic			7456NE/374D)
C2408		10 16V Electrolytic	C5920	22	10V Electrolytic
C2501		1.0 10V Ceramic	C5923	47	6.3V Electrolytic
		(VCR3746CE/EP/374D)	C5925	10	10V Electrolytic
C2502		1.0 10V Ceramic	C5926	0.1	25V S Chip
		(VCR3746CE/EP/374D)	C5930	18p	50V S Chip
C2503		220 6.3V Electrolytic	C5931	18p	50V S Chip
		(VCR3746CE/EP/374D)	C5932	22p	50V S Chip
C2504		0.01 50V S Chip	C5933	47p	50V S Chip
		(VCR3746CE/EP/374D)	C5934	47p	50V S Chip
C2506		1.0 10V S Chip	C5935	47p	50V S Chip
C2507		470 6.3V Electrolytic	C5937	1.0	50V Electrolytic
C2508		1.0 10V S Chip	C5938	47	6.3V Electrolytic
C2509		470 6.3V Electrolytic	C5939	22p	50V S Chip
		(VCR3746CE/EP/374D)	C6681	10	16V Electrolytic
C2604		0.001 50V S Chip			(VCR3746CE/EP/374D)
		(VCR3746CE/EP/374D)	C6682	10	16V Electrolytic
C2605		0.001 50V S Chip			(VCR3746CE/EP/374D)
C4490		0.01 16V Ceramic	C6683	10	16V Electrolytic
C4492		47 16V Electrolytic			(VCR3746CE/EP/374D)
C5001		0.01 16V Ceramic	C6684	1.0	10V Ceramic
C5002		47 6.3V Electrolytic			(VCR3746CE/EP/374D)
C5003		0.01 50V Ceramic	C6685	1.0	10V Ceramic
C5004		47p 50V S Chip			(VCR3746CE/EP/374D)
C5005		0.01 16V Ceramic	C6686	1.0	10V Ceramic
C5007		0.01 16V Ceramic			(VCR3746CE/EP/374D)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>CAPACITORS (Continued)</b>			<b>RESISTORS (Continued)</b>		
C6687		1.0 10V Ceramic (VCR3746CE/EP/374D)	R305		33k 1/8W Carbon
C6688		0.01 50V S Chip (VCR3746CE/EP/374D)	R306		150 0.063W S Chip
C6689		100 16V Electrolytic (VCR3746CE/EP/374D)	R307		10 0.063W S Chip
C7701		47 16V Electrolytic	R309		470 0.063W S Chip (VCR3746NE/CE/I/EP/374D/ 836NE)
C7702		1.0 50V Electrolytic	R309		47 0.063W S Chip (VCR4746NE/7456NE)
C7703		Capacitor	R310		470 0.063W S Chip (VCR3746NE/CE/I/EP/374D/ 836NE)
C7704		0.1 25V S Chip	R310		47 0.063W S Chip (VCR4746NE/7456NE)
<b>RESISTORS</b>			R311		47k 0.063W S Chip
R202		330 0.063W S Chip	R312		47k 0.063W S Chip
R203		22k 0.063W S Chip	R313		47k 1/8W S Chip
R204		22k 0.063W S Chip	R314		47k 0.063W S Chip
R205		390 0.063W S Chip	R315		5.6k 0.063W S Chip
R206		390 0.063W S Chip	R316		10k 1/8W Carbon
R207		1.8k 0.063W S Chip	R330		22k 0.063W Carbon
R208		1.8k 0.063W S Chip	R331		47k 0.063W S Chip
R211		0.0 0.063W S Chip	R332		470 0.063W S Chip
R212		1.5k 0.063W S Chip (VCR4746NE)	R333		5.6k 0.063W S Chip (VCR3746NE/CE/I/7456NE/ 374D/836NE)
R212		560 0.063W S Chip (VCR3746EP/7456NE)	R333		4.7k 0.063W S Chip (VCR4746NE)
R213		2.2k 0.063W S Chip	R334		560 0.063W S Chip
R214		10k 0.063W S Chip (VCR3746CE/I/4746NE/374D)	R335		4.7k 0.063W S Chip (VCR3746CE/374D)
R214		8.2k 0.063W S Chip (VCR3746NE/EP/7456NE/ 836NE)	R335		5.6k 0.063W S Chip (VCR4746NE)
R215		3.3k 0.063W S Chip (VCR3746CE/374D)	R335		6.8k 0.063W S Chip (VCR3746NE/I/EP/7456NE/ 836NE)
R215		2.7k 0.063W S Chip (VCR3746NE/I/EP/4746NE/ 7456NE/836NE)	R336		10k 0.063W S Chip (VCR3746CE/374D)
R217		1.0k 0.063W S Chip	R336		18k 0.063W S Chip (VCR3746NE/I/836NE)
R218		0.0 0.063W S Chip	R336		3.3k 0.063W S Chip (VCR4746NE)
R219		1.2k 0.063W S Chip	R337		47k 0.063W S Chip (VCR4746NE)
R220		1.5k 0.063W S Chip	R337		22k 0.063W Carbon (VCR3746CE/374D)
R221		0.0 1/8W S Chip	R337		27k 0.063W S Chip (VCR3746NE/EP/I/7456NE/ 836NE)
R229		10k 1/8W Carbon	R338		10k 0.063W S Chip (VCR3746CE/I/374D)
R230		10k 0.063W S Chip	R338		22k 0.063W S Chip (VCR3746NE/EP/I/7456NE/ 836NE/836NE)
R250		470 0.063W S Chip (VCR3746CE/4746NE/374D)	R338		3.9k 0.063W S Chip (VCR4746NE)
R250		120 0.063W S Chip (VCR3746NE/I/EP/7456NE/ 836NE)			
R251		560 0.063W S Chip			
R253		5.6k 0.063W S Chip			
R260		4.7k 0.063W S Chip			
R261		4.7k 0.063W S Chip			
R262		1.5k 0.063W S Chip			
R301		680 0.063W S Chip			
R302		680 0.063W S Chip			
R303		1.0k 0.063W S Chip			
R304		22k 0.063W S Chip			






Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>RESISTORS (Continued)</b>			<b>RESISTORS (Continued)</b>		
R339		27k 0.063W S Chip (VCR3746CE/I/7456NE/ 374D)	R626		820 1/8W Carbon (VCR3746NE/I/4746NE/ 7456NE/836NE)
R339		56k 0.063W S Chip (VCR3746NE/4746NE/836NE)	R629		15k 0.063W S Chip
R341		0.0 0.063W S Chip	R630		10k 0.063W S Chip
R501		680 0.063W S Chip	R636		10k 1/8W Carbon
R502		820 0.063W S Chip	R637		10k 1/8W Carbon (VCR3746NE/I/4746NE/ 7456NE/836NE)
R506		10k 0.063W S Chip	R638		5.6k 1/8W Carbon
R507		10k 0.063W S Chip	R639		15k 0.063W S Chip
R508		1.2k 0.063W S Chip	R651		470k 0.063W S Chip (VCR3746NE/CE/I/EP/ 374D/836NE)
R510		27k 0.063W S Chip	R651		47 0.063W S Chip (VCR4746NE/7456NE)
R513		1.0k 0.063W S Chip	R652		6.8k 0.063W S Chip
R514		0.0 0.063W S Chip	R653	31517824	4.7 1/4W Fuse
R515		1.0k 0.063W S Chip	R654		2.7k 1/8W Carbon
R517		2.2k 0.063W S Chip	R655		27 0.063W S Chip
R523		10k 1/8W Carbon	R701		6.8k 0.063W S Chip
R526		0.0 1/8W Carbon (VCR3746CE/374D)	R702		5.6k 0.063W S Chip
R540		10k 1/8W Carbon (VCR3746NE/CE/I/EP/ 7456NE/374D/836NE)	R703		1k 0.063W S Chip
R540		10k 0.063W S Chip (VCR4746NE)	R704		1k 0.063W S Chip
R567		0.0 1/8W Carbon	R705		220k 0.063W S Chip
R576		560 0.063W S Chip	R706		1k 0.063W S Chip
R577		0.0 1/8W Carbon	R707		10k 0.063W S Chip
R602		33k 0.063W S Chip	R708		10k 0.063W S Chip
R603		220 0.063W S Chip	R712		22k 1/8W Carbon
R604		270k 0.063W S Chip	R713		68 1/2W Carbon
R605		6.8k 0.063W S Chip	R714		100 1/8W Carbon
R606		6.8k 0.063W S Chip	R715		1k 0.063W S Chip
R609		3.3k 0.063W S Chip	R716		18k 0.063W S Chip
R610		2.2M 0.063W S Chip	R717		39k 0.063W S Chip
R613		5.6k 1/8W Carbon (VCR3746NE/I/4746NE/ 7456NE/836NE/836NE)	R718		82k 0.063W S Chip
R614		8.2k 0.063W S Chip (VCR3746NE/I/4746NE/ 7456NE/836NE)	R719		15k 0.063W S Chip
R615		47k 0.063W S Chip	R720		1k 1/8W Carbon (VCR3746EP)
R616		15k 0.063W S Chip	R721		220k 0.063W S Chip
R617		1.5k 0.063W S Chip	R722		100k 0.063W S Chip
R618		18k 0.063W S Chip	R723		100k 0.063W S Chip
R619		470 0.063W S Chip	R724		680k 0.063W S Chip
R620		1.0k 0.063W S Chip	R725		1k 1/8W Carbon (VCR3746CE/374D)
R624		56k 0.063W S Chip (VCR3746CE/EP/374D)	R726		68k 0.063W S Chip
R625		1k 0.063W S Chip (VCR3746NE/CE/I/EP/374D/ 836NE)	R727		220k 0.063W S Chip
R625		150 0.063W S Chip (VCR4746NE/7456NE)	R728		330k 0.063W S Chip
			R729		3.9k 0.063W S Chip
			R730		22k 0.063W S Chip (VCR3746NE/I/EP/4746NE/ 7456NE/836NE)
			R731		1k 0.063W S Chip
			R732		1k 0.063W S Chip
			R733		1k 1/8W Carbon
			R734		1k 1/8W Carbon

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>RESISTORS (Continued)</b>			<b>RESISTORS (Continued)</b>		
R735		1k 1/8W Carbon	△ R901	31517825	1.0M 1/2W Carbon
R736		1k 1/8W Carbon	△ R902	31517827	Resistor
R737		1k 0.063W S Chip	△ R903	31517826	6.8M 1/2W Resistor
R738		1k 0.063W S Chip	△ R904	31517826	6.8M 1/2W Resistor
R739		3.9k 0.063W S Chip	R905		220k 1/2W Carbon
R740		0.0 0.063W S Chip (VCR3746NE//4746NE/ 7456NE/836NE)	R906		220k 1/2W Carbon
R741		1k 1/8W Carbon	R907		56k 1/4W Carbon
R742		1k 1/8W Carbon	△ R908	31517830	Resistor
R743		1k 0.063W S Chip	R909		47 1/2W Carbon
R744		100 1/8W Carbon	R910		470 1/4W Carbon
R745		1k 1/8W Carbon	R911		47 1/2W Carbon
R746		1k 0.063W S Chip	R921	31517836	0.47 1.4W Fuse
R748		10k 0.063W S Chip	R922		4.7 1/2W Carbon
R749		150k 0.063W S Chip	R927	31517834	10 1/4W Fuse
R750		220 1/8W Carbon	R931		220 1/8W Carbon
R751		150k 0.063W S Chip	R932		10k 0.063 S Chip
R752		220 1/8W Carbon	R933		220 1/8W Carbon
R753		12k 1/8W Carbon	R934		220 0.063 S Chip
R754		12k 1/8W Carbon	R935		15k 0.063 S Chip
R755		0.0 0.063W S Chip	R936		2.7k 1/8W Carbon
R756		150 1/4W Carbon	R937		2.7k 1/8W Carbon
R757		100k 0.063W S Chip	R938		3.9k 0.063W S Chip
R758		270 1/8W Carbon	R939		6.8k 0.063W S Chip
R759		100k 0.063W S Chip	R940		1k 1/8W Carbon
R760		270 1/8W Carbon	R941		3.9k 0.063W S Chip
R761		22k 0.063W S Chip	R950		5.6k 0.063W S Chip
R762		22k 0.063W S Chip	R951		33 0.063W S Chip
R764		1k 1/8W Carbon	R952		27 1/8W Carbon
R766		1k 0.063W S Chip	R953		33k 0.063W S Chip
R769		1.0k 0.063W S Chip	R954		0.56 1/8W Carbon
R770		10k 0.063W S Chip	R955		0.56 1/8W Carbon
R771		10k 0.063W S Chip	R958		5.6k 0.063W S Chip
R772		22k 0.063W S Chip	R959		33 0.063W S Chip
R773		10k 1/8W Carbon	R960		220 1/4W Metal Oxide
R774		330k 0.063W S Chip	R961		5.6k 0.063W S Chip
R775		10k 0.063W S Chip	R962		33 0.063W S Chip
R776		100k 0.063W S Chip	R963		220 1/4W Metal Oxide
R777		100k 0.063W S Chip	R965		22k 1/8W Carbon
R779		47k 0.063W S Chip	R971		1.0k 1/2W Carbon
R780		1.2M 0.063W S Chip	R975		1.0k 1/2W Carbon
R781		22k 0.063W S Chip	R981		10k 0.063W S Chip
R782		10k 0.063W S Chip	R982		10k 0.063W S Chip
R784		2.7k 0.063W S Chip	R985	31517836	0.47 1/4W Fuse
R786		1k 1/8W Carbon	R991		2.2k 0.063W S Chip
R787		1k 1/8W Carbon	R992		4.7k 0.063W S Chip
R788		1k 1/8W Carbon	R994		0.0 0.063W S Chip (VCR3746NE/CE/EP/374D/ 836NE)
R789		1k 0.063W S Chip	R1401		560k 0.063W S Chip
R790		1k 0.063W S Chip	R1402		100 0.063W S Chip
R791		1k 0.063W S Chip	R1403		330k 0.063W S Chip
R792		10k 0.063W S Chip	R1406		0.0 0.063W S Chip
R793		1.0k 0.063W S Chip	R1410		5.6K 0.063W S Chip (VCR3746CE//4746NE/ 374D/836NE)
R794		1k 0.063W S Chip			
R799		470 0.063W S Chip			

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>RESISTORS (Continued)</b>			<b>RESISTORS (Continued)</b>		
R1410		1.5k 1/8W Carbon (VCR3746NE/7456NE)	R2011		12k 0.063W S Chip (VCR3746CE/I/374D)
R1411		0.0 0.063W S Chip	R2012		470 0.063W S Chip
R1412		1.0k 0.063W S Chip (VCR3746NE/I/4746NE/ 7456NE/836NE)	R2013		1.8k 0.063W S Chip (VCR3746I/4746NE)
R1801		1.2M 0.063W S Chip (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)	R2013		18k 0.063W S Chip (VCR3746CE/374D)
R1802		6.8k 0.063W S Chip (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)	R2201		0.0k 0.063W S Chip (VCR3746EP/4746NE/ 7456NE)
R1803		1.2M 0.063W S Chip (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)	R2401		3.9k 0.063W S Chip
R1804		6.8k 0.063W S Chip (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)	R2402		560 0.063W S Chip
R1805		1M 0.063W S Chip (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)	R2403		150k 0.063W S Chip
R1806		2.2k 0.063W S Chip (VCR3746NE/CE/EP/ 4746NE/7456NE/374D/836NE)	R2407		2.7k 0.063W S Chip
R1807		100k 0.063W S Chip (VCR3746NE/CE/EP/ 4746NE/7456NE/374D/836NE)	R2408		8.2k 0.063W S Chip
R1810		220 1/8W Carbon (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)	R2409		680k 0.063W S Chip
R1811		220 1/8W Carbon (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)	R2454		390 0.063W S Chip (VCR3746NE/I/4746NE/ 7456NE/836NE)
R1812		220 1/8W Carbon (VCR3746NE/CE/4746NE/ 7456NE/374D/836NE)	R2501		150 1/4W Carbon
R2001		1k 0.063W S Chip	R2502		120 1/4W Carbon
R2002		1.5k 0.063W S Chip	R2503		100k 0.063W S Chip (VCR3746CE/EP/374D)
R2003		1M 0.063W S Chip	R2504		100k 0.063W S Chip (VCR3746CE/EP/374D)
R2004		220 1/8W Carbon	R2505		330 1/4W Carbon (VCR3746CE/EP/374D)
R2005		2.7k 0.063W S Chip	R2506		75 0.063W S Chip
R2006		5.6k 0.063W S Chip	R2507		100 0.063W S Chip
R2007		0.0 0.063W S Chip	R2508		75 0.063W S Chip (VCR3746CE/EP/374D)
R2008		100 0.063W S Chip	R2509		75 0.063W S Chip
R2009		1.0k 0.063W S Chip (VCR3746NE/4746NE/836NE)	R2510		100 0.063W S Chip
R2009		1.2k 0.063W S Chip (VCR3746CE/I/EP/ 7456NE/374D)	R2511		75 0.063W S Chip
R2010		1.2k 0.063W S Chip	R2513		22k 0.063W Carbon (VCR3746CE/EP/374D)
R2011		1.2k 0.063W S Chip (VCR4746NE)	R2515		10k 0.063W S Chip (VCR3746CE/EP/374D)
R2011		560 0.063W S Chip (VCR3746NE/EP/745NE/ 836NE)	R2516		10k 0.063W S Chip (VCR3746CE/EP/374D)
			R2517		10k 0.063W S Chip (VCR3746CE/EP/374D)
			R2518		10k 0.063W S Chip (VCR3746CE/EP/374D)
			R2519		1.0M 0.063W S Chip (VCR3746CE/EP/374D)
			R2520		22k 0.063W Carbon (VCR3746CE/EP/374D)
			R2521		22k 0.063W S Chip (VCR3746CE/374D)
			R2522		22k 0.063W S Chip (VCR3746CE/EP/374D)
			R2523		10k 0.063W S Chip (VCR3746CE/EP/374D)

Ref. No.	Part No.	Description
<b>RESISTORS (Continued)</b>		
R2541		100k 0.063W S Chip (VCR3746CE/EP/374D)
R2544		0.0 0.063W S Chip (VCR3746CE/EP/374D)
R2548		0.0 0.063W S Chip (VCR3746CE/EP/374D)
R2549		22k 0.063W S Chip (VCR3746CE/EP/374D)
R2601		820 1/4W Carbon
R2609		47k 0.063W S Chip (VCR3746CE//EP/4746NE/ 7456NE/374D)
R2611		15k 0.063W S Chip (VCR3746CE/EP/374D)
R2612		18k 0.063W S Chip (VCR3746CE/EP/374D)
R2613		10k 0.063W S Chip (VCR3746CE/EP/374D)
R2614		100 0.063W S Chip
R5001		100k 0.063W S Chip
R5002		100k 0.063W S Chip
R5003		100k 0.063W S Chip
R5004		100k 0.063W S Chip
R5005		100k 0.063W S Chip
R5006		1.0k 1/8W Carbon
R5007		10k 1/2W Carbon
R5008		27k 1/8W Carbon
R5010		10k 1/8W Carbon (VCR3746I/EP)
R5801		10k 0.063W S Chip
R5802		10k 0.063W S Chip
R5803		2.2k 1/8W Carbon
R5804		2.2k 0.063W S Chip
R5805		10k 0.063W S Chip
R5806		10k 0.063W S Chip
R5807		560 0.063W S Chip (VCR3746NE//EP/7456NE/ 836NE)
R5807		820 0.063W S Chip (VCR3746CE/4746NE/374D)
R5808		560 0.063W S Chip
R5809	31129688	VR
R5810		100k 0.063W S Chip (VCR4746NE)
R5810		47k 0.063W Carbon (VCR3746NE/CE//EP/ 7456NE/374D/836NE)
R5811		3.3k 0.063W S Chip
R5812		2.2k 0.063W S Chip
R5813		3.3k 0.063W S Chip
R5814		2.2k 0.063W S Chip (VCR3746NE/CE//EP/ 7456NE/374D/836NE)
R5814		1.8k 0.063W S Chip (VCR4746NE)

Ref. No.	Part No.	Description
<b>RESISTORS (Continued)</b>		
R5815		56k 0.063W S Chip
R5816		56k 1/8W Carbon (VCR3746NE/CE//I/4746NE/ 7456NE/374D/836NE)
R5817		220 0.063W S Chip (VCR3746NE/CE//I/4746NE/ 7456NE/374D/836NE)
R5901		1.0k 0.063W S Chip
R5902		10k 0.063W S Chip
R5903		1.5k 1/8W Carbon
R5904		1.0k 1/8W Carbon
R5905		56k 0.063W S Chip
R5908		47k 1/8W Carbon
R5909		22k 1/8W Carbon
R5910		470 1/8W Carbon (VCR3746NE/CE//I/4746NE/ 7456NE/374D/836NE)
R5910		330 1/8W Carbon (VCR3746EP)
R5921		39k 0.063W S Chip
R5922		10k 0.063W S Chip
R5923		47k 0.063W S Chip
R5924		1.0k 0.063W S Chip
R5925		180 0.063W S Chip
R5931		560 1/8W Carbon (VCR3746NE/CE//I/4746NE/ 7456NE/374D/836NE)
R5931		330 1/8W Carbon (VCR3746EP)
R5963		390 0.063W S Chip
R5991		0.0 0.063W S Chip (VCR3746CE/374D)
R5994		0.0 0.063W S Chip (VCR3746CE/374D)
R5994		180 1/8W Carbon (VCR3746EP)
R6612		820 0.063W S Chip (VCR3746CE/EP/374D)
R6616		2.2 0.063W S Chip (VCR3746CE/EP/374D)
R6617		4.7k 0.063W S Chip (VCR3746CE/EP/374D)
R6618		1k 0.063W S Chip
R6619		22k 1/8W Carbon (VCR3746NE//I/4746NE/ 7456NE/836NE)
R6619		5.6k 0.063W S Chip (VCR3746CE/EP/374D)
R6620		1.2k 1/8W Carbon
R6623		22k 1/8W Carbon (VCR3746NE//I/4746NE/ 7456NE/836NE)
R6623		5.6k 0.063W S Chip (VCR3746CE/EP/374D)

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
<b>RESISTORS (Continued)</b>			<b>RESISTORS (Continued)</b>		
R6624		150 0.063W S Chip (VCR3746CE/EP/374D)	RJ28		0.0 0.063W S Chip (VCR3746NE//EP/ 4746NE/7456NE/836NE)
R6629		22k 1/8W Carbon (VCR3746NE//4746NE/ 7456NE/836NE)	<b>MISCELLANEOUS PARTS</b>		
R6629		5.6k 0.063W S Chip (VCR3746CE/EP/374D)	 41314365		AC Cord
R6631		22k 1/8W Carbon (VCR3746NE//4746NE/ 7456NE/836NE)	CN1501	41314366	Tun-Conv Cable
R6631		5.6k 0.063W S Chip (VCR3746CE/EP/374D)	DG5001	36861179	Digitron
R6650		820 0.063W S Chip	 F901	43752108	Fuse, T2AH/250V
R6672		5.6k 1/8W S Chip (VCR4746NE/745NE)	FB701		Balun
R6673		560 0.063W S Chip (VCR3746NE//4746NE/ 7456NE/836NE)	FB2501		Balun
R6674		820 0.063W S Chip (VCR3746NE//4746NE/ 7456NE/836NE)	FB2502		Balun (VCR3716EP)
R6681		47k 0.063W S Chip (VCR3746CE/EP/374D)	FB6301		Balun
R6682		6.8k 0.063W S Chip (VCR3746CE/EP/374D)	FB6302		Balun
R6692		0.0 0.063W S Chip (VCR3746CE/374D)	 FH901	43752146	Fuse Holder
R6803		0.0 0.063W S Chip (VCR3746NE//4746NE/ 7456NE/836NE)	 FH902	43752147	Fuse Holder
R6804		0.0 0.063W S Chip (VCR3746CE/374D)	P501		Plug, 3pin
R6806		0.0 0.063W S Chip (VCR3746CE/374D)	P701		Plug, 6pin
R7701		2.2 1/4W Resistor	P702		Plug, 2pin
R7702		10k 1/8W Carbon	P703		Plug, 9pin
R7703		10k 1/8W Carbon	 P901	41314353	Plug, 2pin
RJ1		0.0 0.063W S Chip (VCR3746NE//EP/ 4746NE/7456NE/836NE)	P5001		Plug, 2pin
RJ3		0.0 0.063W S Chip (VCR3746NE//EP/ 4746NE/7456NE/836NE)	P6801		Plug
RJ11		0.0 0.063W S Chip (VCR3746NE//EP/ 4746NE/7456NE/836NE)	P6802		Plug, 14pin
RJ12		0.0 0.063W S Chip (VCR3746NE//EP/ 4746NE/7456NE/836NE)	P6805		Plug, 2pin
RJ13		0.0 0.063W S Chip (VCR3746//4746NE/7456NE)	RMC5501	69134748	Remote Receiver
RJ22		0.0 0.063W S Chip (VCR3746NE//EP/ 4746NE/7456NE/836NE)	S701	41127607	Switch, Rec
			S5001	41127612	Switch, Standby
			S5002	41127612	Switch, Ch +
			S5003	41127612	Switch, Ch -
			S5004	41127612	Switch, Int
			S5005	41127612	Switch, Test
			SC301		Socket, 7pin
			SC701		Socket, 7pin
			SC2501		Socket, RGB
			SC2502		Socket, RGB
			SC6301		Wire Harness
			SC6302		Socket, 14pin
			SC6802		Socket, 8pin
			TP1501		Plug, 4pin
			TP5801		Plug, 2pin

— End of Main —

Ref. No.	Part No.	Description
OPERATION UNIT		
SC8801		Socket, 6pin (OA)
S8801	41127613	Switch, Stop/Eject
S8802	41127613	Switch, PLAY
S8803	41127613	Switch, REC
S8804	41127613	Switch
S8805	41127613	Switch, Ch +
S8806	41127613	Switch, Ch -

Ref. No.	Part No.	Description
MECHANISM CHASSIS PARTS		
1		Main Chassis Ass'y
2		Supply Impedance Roller
3		Supply Impedance Roller Cap
4	75383478	Supply Impedance Roller Lower Frange
5	75383479	Supply Impedance Roller Inner
6	86817304	Supply Pole Base Ass'y
7	86817305	Take-Up Pole Base Ass'y
8	75384916	Guide Roller
9	83186180	Reverse Guide Lever Ass'y
10	73584917	Reverse Guide Spring
11	73584918	Reverse Guide Spacer
12	43359496	Audio/Control Head
13	83186171	Audio/Control Head Arm
14	73584919	Audio/Control Head Arm Spring
15	73584920	Azimuth Spring
16	43359497	Full Erase Head
17	83186170	Audio/Control Head Arm Spacer
18		Audio/Control Head PWB
19		Socket, 8 pin
20	76184353	Reel Belt
21	75383480	Pinch Roller Lever Ass'y
22	86817306	Pinch Double Action Lever
23	75383481	Pinch Drive Lever Ass'y
24	86817307	Pinch Drive Cam
25	83186172	Open Lever
26	73584921	Pinch Double Action Spring
28	83186173	Tension Arm Ass'y
29	83186174	Tension Arm Boss
30	73584923	Tension Spring
31	86817308	Tension Band Ass'y
32	75251442	Tension Pole Adjust Cam
33	86817309	Master Cam
34		Motor Pulley
35	86817348	Worm Gear
36	86817312	Worm Wheel Gear
37	75251443	Relay Gear
38		Loading Motor Block
40	75251444	Shifter
41	86817313	Shifter Drive Lever Ass'y
42	86817314	Take-Up Loading Gear
43	83186181	Take-Up Loading Arm Ass'y
44	75251445	Supply Loading Gear
45	83186182	Supply Loading Arm Ass'y
46	83186183	Auto Head Cleaner Ass'y

— End of Operation —



Ref. No.	Part No.	Description
<b>MECHANISM CHASSIS (Continued)</b>		
47	73584924	Loading Double Action Spring
48	75484283	Reel Disk
49	75484284	Reel Idler
50	83186184	Clutch Lever
51	75383482	Clutch Gear Ass'y
52	75484285	Reel Pulley Ass'y
53	75251446	Playback Gear
54	83186176	Clutch Connect Arm
55	86817351	Take-Up Main Brake Ass'y
56	86817316	Take-Up Lock Lever
57	86817352	Supply Main Brake Lever Ass'y
58	73584925	Main Brake Spring
59	75251447	Cassette Housing Control Drive Gear
60	75251448	Light Guide
61	83186185	Slow Brake Ass'y
62		Slow Brake Spring
63	44329415	Capstan Motor
64	44329416	Loading Motor
65	41314352	Lead Wire for Loading Motor
66	41314349	FFC for Audio/Control
67	41314363	FFC for Drum Motor
70	86817319	Drum Base
71		Drum Base Mounting Screw (SW3P+8S)
72	86817320	Drum Earth Brush
73	73584927	Drum Earth Brush Spring
74	44329419	Drum Drive Motor
75		Drum Drive Motor Mounting Screw (SW2.6P+6S)
76	43359503	Upper and lower drum Ass'y

Ref. No.	Part No.	Description
<b>CASSETTE HOUSING CONTROL PARTS</b>		
300	83186194	Cassette Housing Control Ass'y
301	86817323	Slide Holder (L)
302	86817324	Slide Holder (R)
303	86817347	Drive Angle
304	83186188	Double Action Rack
305	73584928	Double Action Spring
306		Slider
307	86817325	Holder (L)
308	83186189	Proof Lever (L)
309	73584929	Proof Lever (L) Spring
310	86817326	Holder (R)
311	73584930	Cassette Spring
312	83186190	Proof Lever (R)
313	73584931	Proof Lever (R) Spring
314		Drive Gear (L)
316		Drive Gear (R)
317	73584933	Drive Gear (R) Spring
318	75251449	Synchro Gear
319	75251450	Main Shaft
320	86817345	Upper Plate
321	86817328	Door Open Lever
322	83186177	Sensor Lever
323	73584934	Sensor Lever Spring
324		C3P+8S (for Cassette Housing Control)

— End of Mechanism Chassis Parts —

— End of Cassette Housing Control Parts —

Ref. No.	Part No.	Description
SCREWS, NUTS AND WASHERS		
200		Set Screw
201		Audio/Control Head Screw
202		Tilt Adjusting Screw
203		Azimuth Adjusting Screw (2.6P+6S)
204		Screw, C2.6P+8S (For FE Head)
206		Screw, SW3P+5S (For Loading Motor Block)
207		Screw, C2.6P+7S (For Capstan Motor)
208		Screw, C2.6P+6S (For Loading Motor Angle Ass'y)
209		Screw, C3P+8S (For Drum Base)
210		X-Position Adjusting Nut
211	86817321	Reverse Guide Adjusting Nut
212		Audio/Control Head Adjusting Nut (M4)
214		Washer, W5.2P-11-0.5 (Reel Height Adj.)
215		Washer, W5.2P-11-0.3 (Reel Height Adj.)
216		Washer, W5.2P-11-0.4 (Reel Height Adj.)
217		Washer, W5.2P-11-0.6
218		Washer, W5.2P-11-0.7
219		Washer, W3.1-7-0.25
220		Cut Washer, CW4.5P-10-0.5
221		Cut Washer, CW2.6P-5.4-0.5
222		Cut Washer, CW2.6P-6-0.5
223		E-Ring, E-4
229		Screw, C3P+4S (For Slow Brake Spring)

Ref. No.	Part No.	Description
MECHANICAL PARTS		
601		Main Frame Ass'y
601-1		Main Frame
601-2	62734066	Foot Felt
602		Antenna Terminal Cover
603	61355218	Top Cabinet (VCR3746NE/CE/II/EP)
603	61355218	Top Cabinet (VCR4746NE/7456NE)
604		Bottom Plate
605		Toe Cabinet Fixing Angle (R)
606	86817346	Top Cabinet Fixing Angle (L)
607		H/A Shield
608		Spacer
609		Screw
610		Screw
611		Screw
612		Screw
613		Screw
614		Screw
615		Spacer
616		Screw
618		Spacer
650		Convertor Earth Angle

End of Screws, Nuts and Washers

End of Mechanical Parts

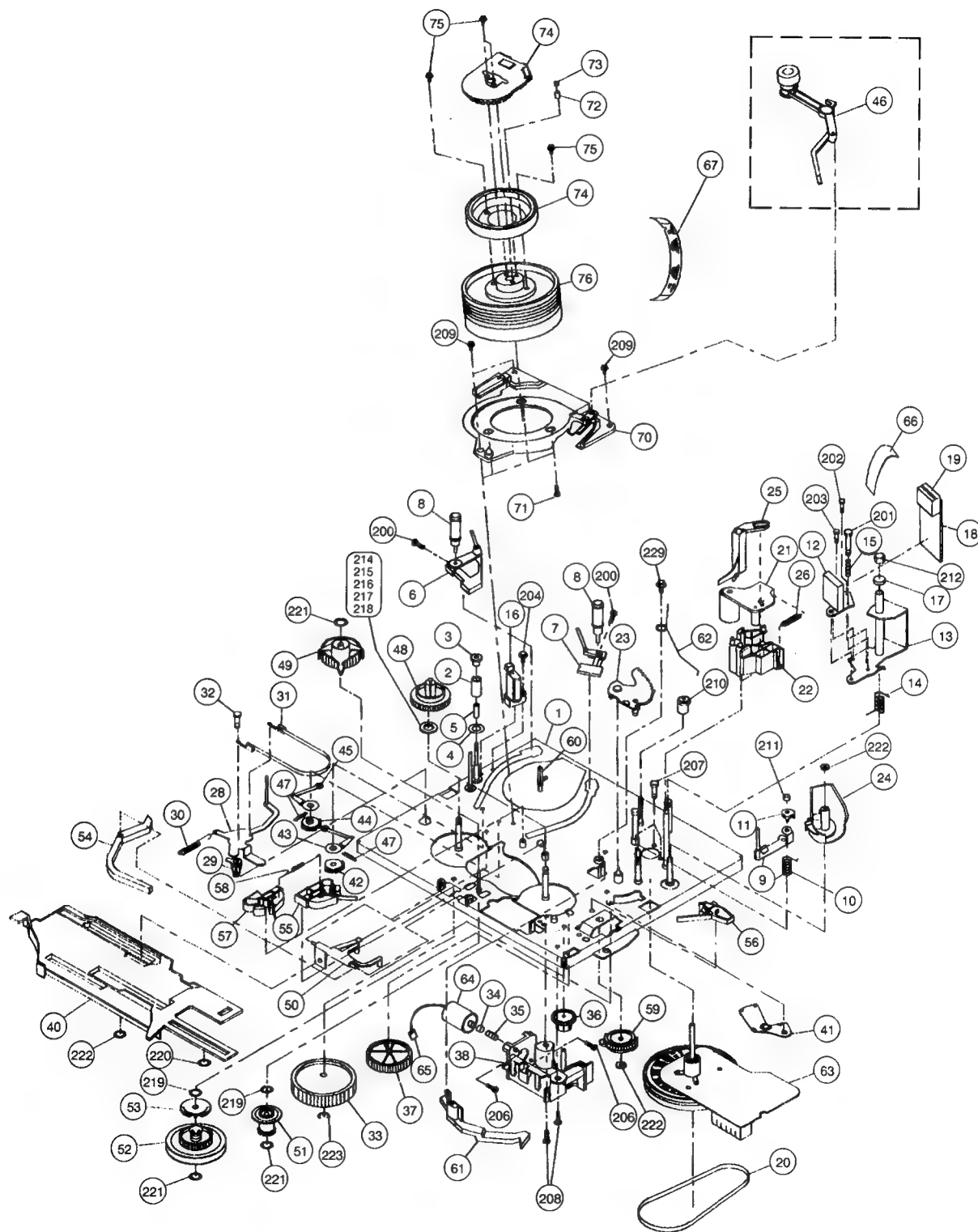
Ref. No.	Part No.	Description
FRONT PANEL PARTS		
501	64183498	Front Panel Ass'y (VCR3746NE)
501	64183497	Front Panel Ass'y (VCR3746CE)
501	64184201	Front Panel Ass'y (VCR3746I)
501	64183499	Front Panel Ass'y (VCR3746EP)
501	64184216	Front Panel Ass'y (VCR4746NE)
501	64184218	Front Panel Ass'y (VCR7456NE)
501	64184224	Front Panel Ass'y (VCR374D)
501	64184225	Front Panel Ass'y (VCR836NE)
501-1	64184203	Front Panel (VCR3746NE)
501-1	64184202	Front Panel (VCR3746CE)
501-1	64184205	Front Panel (VCR3746I)
501-1	64184204	Front Panel (VCR3746EP)
501-1	64184217	Front Panel (VCR4746NE)
501-1	64184219	Front Panel (VCR7456NE)
501-1	64184220	Front Panel (VCR374D)
501-1	64184226	Front Panel (VCR836NE)
501-2	86817344	Badge, "NOKIA" (VCR3746NE/CE//EP)
501-2	86817344	Badge, (VCR374D)
501-3	64660262	Cassette Flap (VCR3746NE/CE//EP)
501-3	64660275	Cassette Flap (VCR4746NE/7456NE)
501-3	64660274	Cassette Flap (VCR836NE)
501-4	63280481	Front Decoration Window (VCR3746NE/CE//EP)
501-4	63280492	Front Decoration Window (VCR4746NE/7456NE)
501-4	63280489	Front Decoration Window (VCR374D)
501-4	63280488	Front Decoration Window (VCR836NE)
501-5	63280478	Button, Operate
501-6	63280479	Button, Channel/Rec
501-7		Button, Channel Set
501-8	64660263	Cassette Spring
502		Dial
503	63280480	Button Ass'y
503-1		Button, Stop/Eject
503-2		Button, Pause/Still
503-3		Button Holder
503-4		Spring
503-5		Button, Play

Ref. No.	Part No.	Description
SUPPLIED ACCESSORIES		
ACCESSORIES		
	41314245	75ohm Coaxial Cable
	56521912	Infrared Remote Control (VCR3746NE/CE//EP/374D)
	56521926	Infrared Remote Control (VCR836NE)
	56521929	Infrared Remote Control (VCR4746NE)
	56521917	Infrared Remote Control (VCR7456NE)
ACCESORIES (NOT REPLACEMENT ITEM)		
	66127566	Operation Manual (VCR3746NE)
	66127565	Operation Manual (VCR3746CE)
	66127567	Operation Manual (VCR3746I)
	66127568	Operation Manual (VCR3746EP)
	66127808	Operation Manual (VCR4746NE)
	66127809	Operation Manual (VCR7456NE)
	66127810	Operation Manual (VCR374D)
	66127811	Operation Manual (VCR836NE)
	61628960	Printed Packing Case (VCR3746NE)
	61628959	Printed Packing Case (VCR3746CE)
	61628962	Printed Packing Case (VCR3746I)
	61628961	Printed Packing Case (VCR3746EP)
	61628983	Printed Packing Case (VCR4746NE)
	61628984	Printed Packing Case (VCR7456NE)
	61628979	Printed Packing Case (VCR374D)
	61628980	Printed Packing Case (VCR836NE)

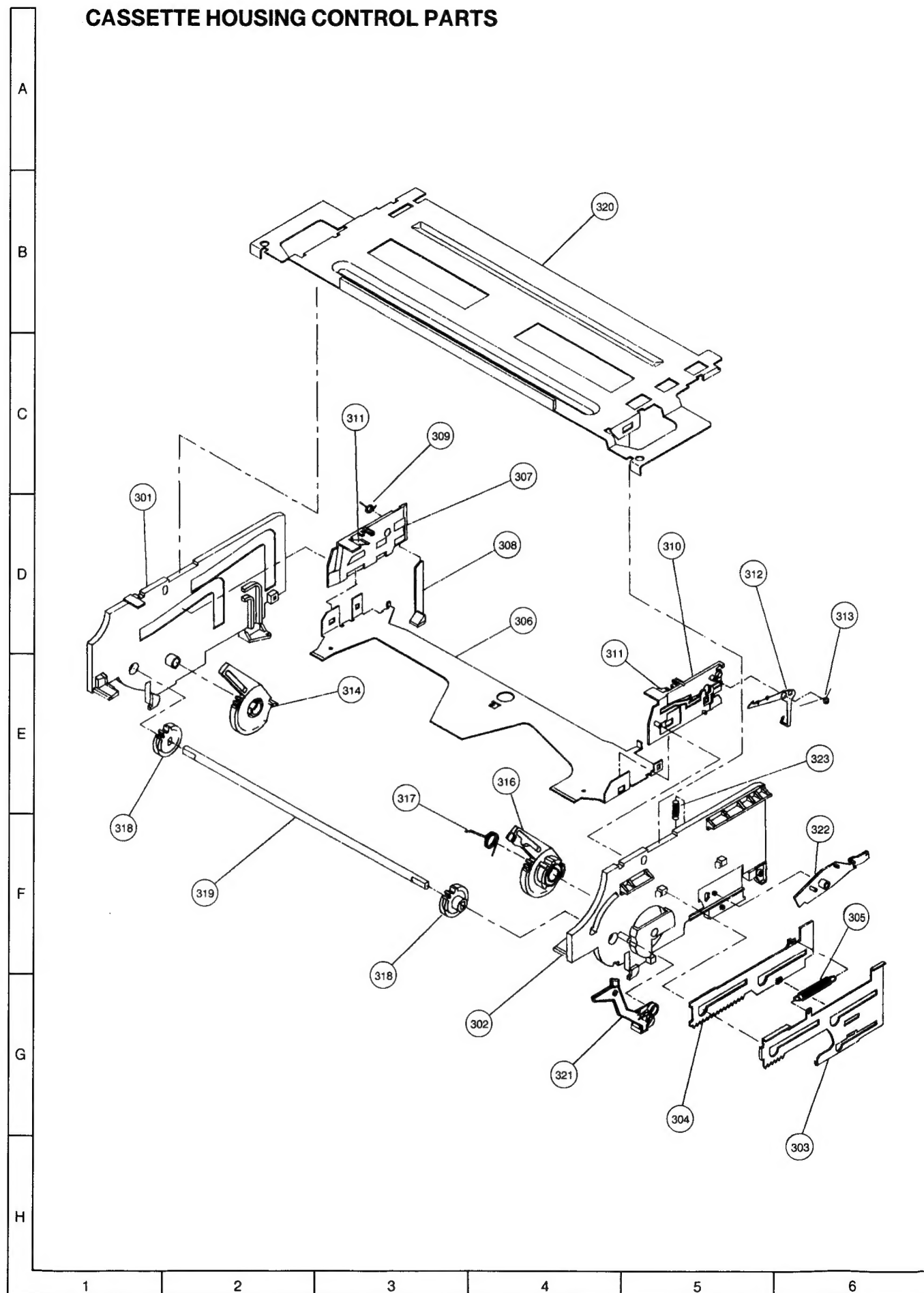
— End of Front Panel Parts —

— End of Supplied Accessories —

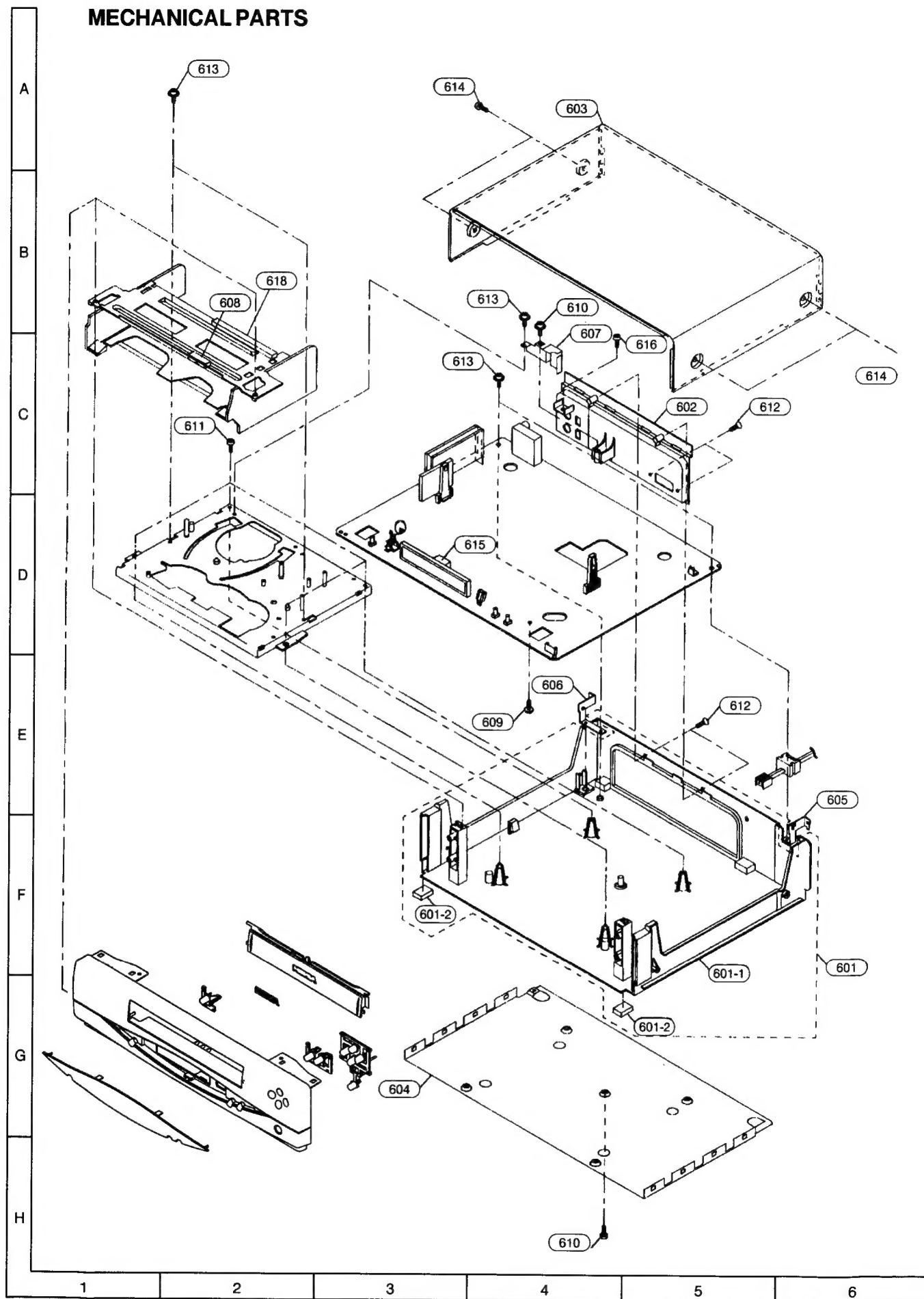
# 11. EXPLODED VIEWS/ MECHANISM CHASSIS PARTS



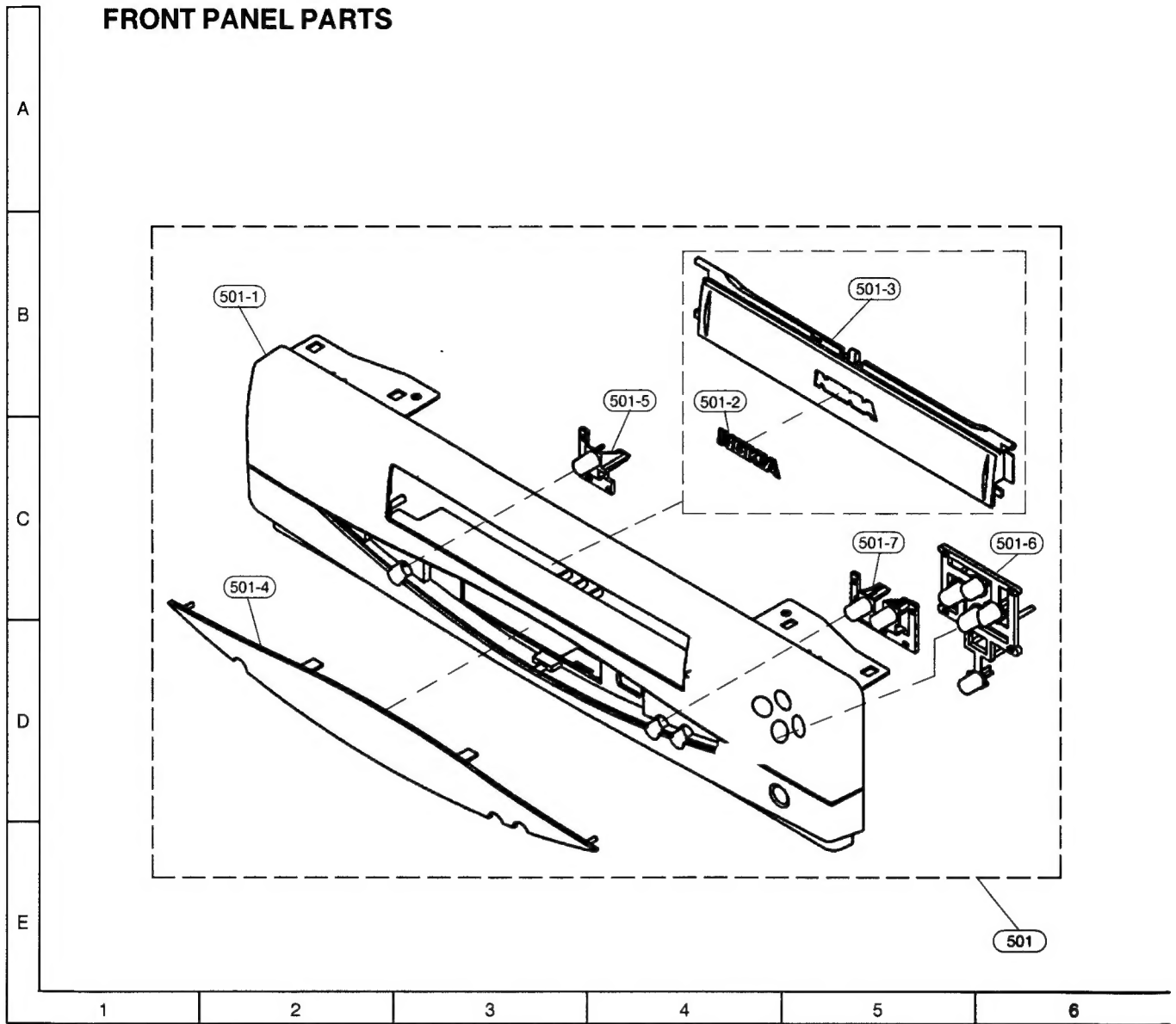
# CASSETTE HOUSING CONTROL PARTS



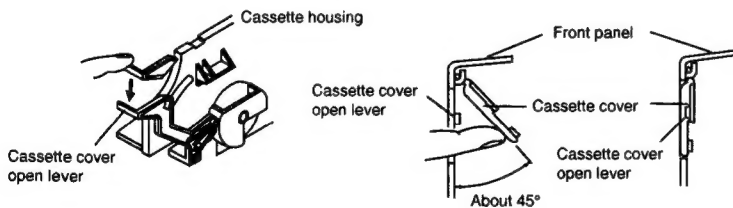
# MECHANICAL PARTS



## FRONT PANEL PARTS



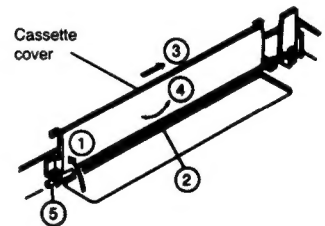
### PRECAUTION ON FRONT PANEL SET-UP



Before attaching the front panel in position, make sure that the cassette cover open lever is in its right place (lower-most). If it is out of position, push it down with a finger.

Keep the cassette cover about 45° open and make sure that the cassette cover open lever is between the front panel and the cassette cover. Now fix the front panel in place.

Do not mount the front panel with the cassette cover tilted too open. Otherwise the cassette cover might wrongly run on the cassette housing.



#### Removing the cassette compartment cover.

- 1 Open the cassette compartment cover fully.
- 2 Remove the center positioner.
- 3 Slide the cover to the right.
- 4 Slightly bend the cover.
- 5 Draw out the left-side rod.

## 12. PACKING OF THE SET

### • Setting position of the Knobs

RF Converter	at "E36" position
Test Signal	at "OFF" position

